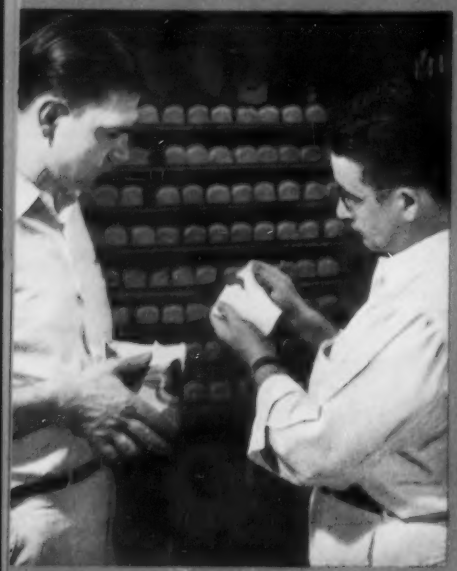
efactor—HTST Advance

JUNE 1956

35 CENTS

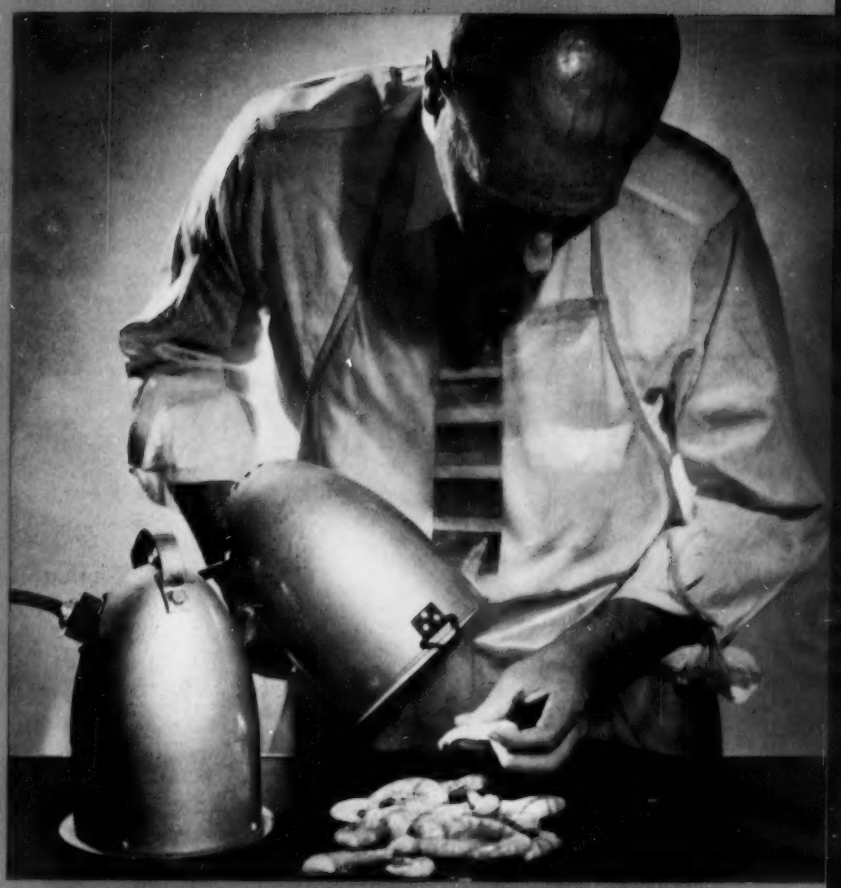
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION



INGREDIENTS • Whey solids become a No. 1 food improver. FE Report, p. 74

PERSONNEL • You're needed up top, Mr. T.—if you have what it takes. p. 49



SANITATION • Black light speedily detects spoiling food, also plant filth. Bad shrimp fluoresce white. p. 52

ALSO: PRODUCTS • PROCESSING • MAINTENANCE INSTRUMENTS • ENGINEERING • MATERIALS HANDLING PACKAGING • TRANSPORTATION • QUALITY CONTROL

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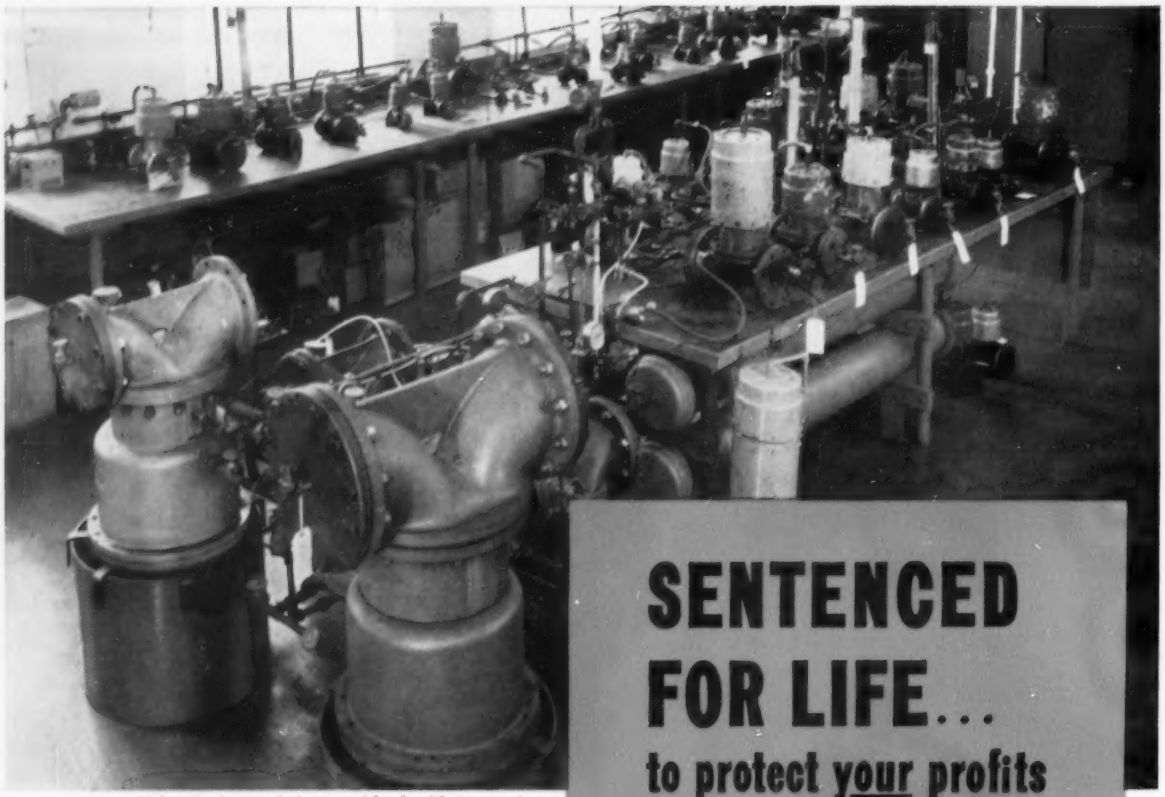

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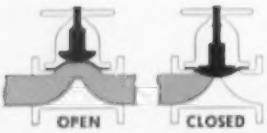

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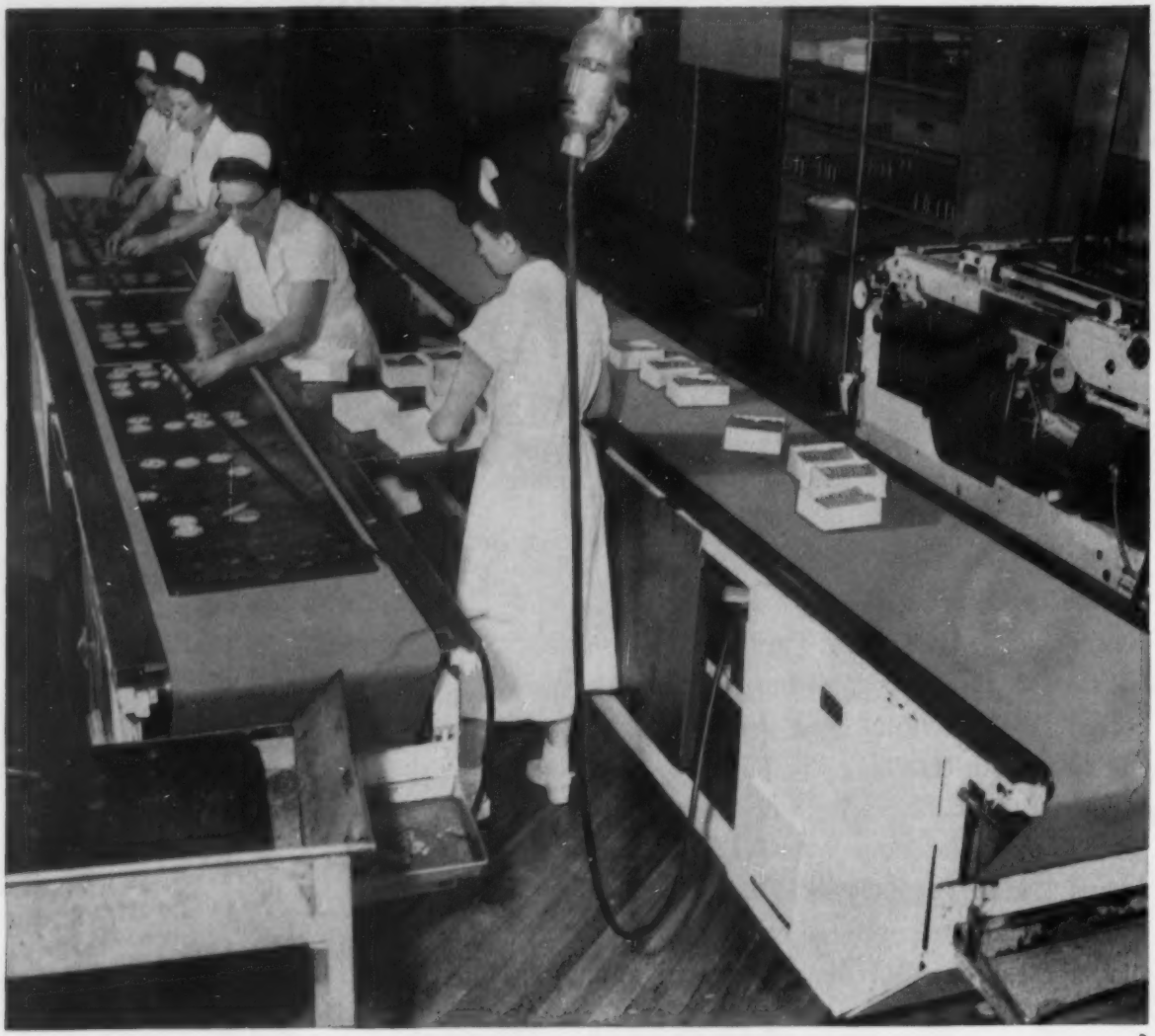

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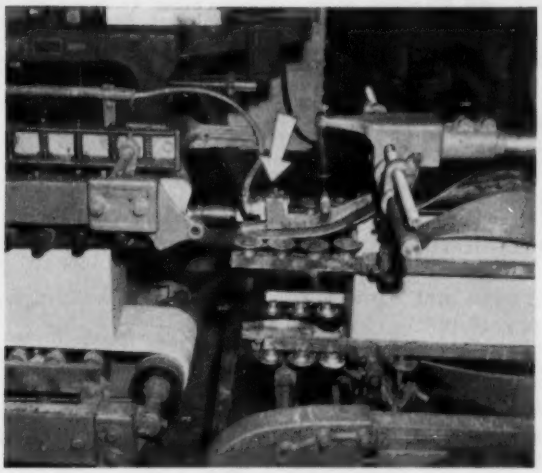
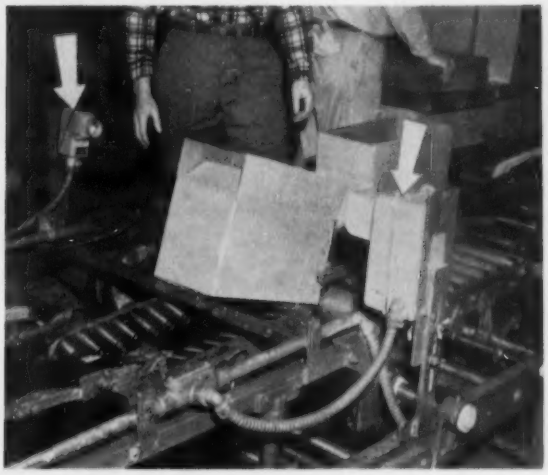
PRACTICAL IDEAS





Case-Conveyor Innovations

Control, by simple instrumentation, of two operations in our case sealing line has accomplished these objectives:

1. Improved the effectiveness of adhesive.
2. Minimized damage to cases during sealing operation.

Maximum Effect of Sealer

Everyone familiar with the casing operation knows that for most satisfactory sealing, every case should remain under pressure in the sealer until adhesive is firmly set. Length of sealer space in plant, production speed, etc., seldom permit cases to remain in the sealer for the most desirable period.

When a sealer is operated at constant speed, the length of time a case is under pressure is governed entirely by the speed of the sealer, which in turn is usually set at optimum production speed.

However, if the forward movement of the unit is stopped as soon as the last case is entirely under pressure and only started again when the next case is ready to move into the sealer, maximum effect can be maintained.

This is done with a microswitch (arrow in left photo), which is tripped by a closed case just before it enters sealer.

Tripping the micro closes circuit to sealer motor, thereby starting conveyor belts in motion. Sealer motor stops when oncoming case is in place in the sealer. Thus, cases remain in the unit the maximum time possible without interrupting or slowing down production.

Only Positioned Cases to Sealer

Should a case arrive out of alignment at the closer, damage to case and cartons and also loss of product could result, unless an ever-watchful operator is stationed to prevent such occurrence.

Installation of a photoelectric switch (arrows in right photo), near the entrance of the closer, detects dangerous misalignment of cases on the conveyor and stops the unit before any mishap can take place.

Thus, the chances of damaged cases, cartons, or product at the closing station are avoided without requiring the constant presence of a vigilant operator.—*Paul Blakeslee, Maintenance Supervisor, Seabrook Farms Co., Bridgeton, N. J.*

Ends Frost-Freezing on Floors

When defrosting refrigerated areas, ice and snow often fall to the floor to form a dangerous, slippery surface that is very difficult and costly to remove.

Here is an easy and inexpensive way to prevent the formation of ice on floors during snow removal periods:

Before defrosting is started, areas under coils or plates are covered with a layer of corrugated paper. Place the flat surface up, the corrugation down. One such paper Flex-Pack is obtainable in rolls 60 in. wide and 250 ft long at a price of approximately $14 per roll.

Now when ice and snow drop from coils during defrosting, it falls on the paper and freezes there. The frozen layer is easily removed since the corrugated paper does not freeze to the floor.

Place the paper in the holding room the day before defrosting. Then the paper will be at the same temperature as the room and the dripping snow and ice will freeze on it without soaking in.—*The Refrigeration Research Foundation Bulletin.*

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(Formerly Food Industries)

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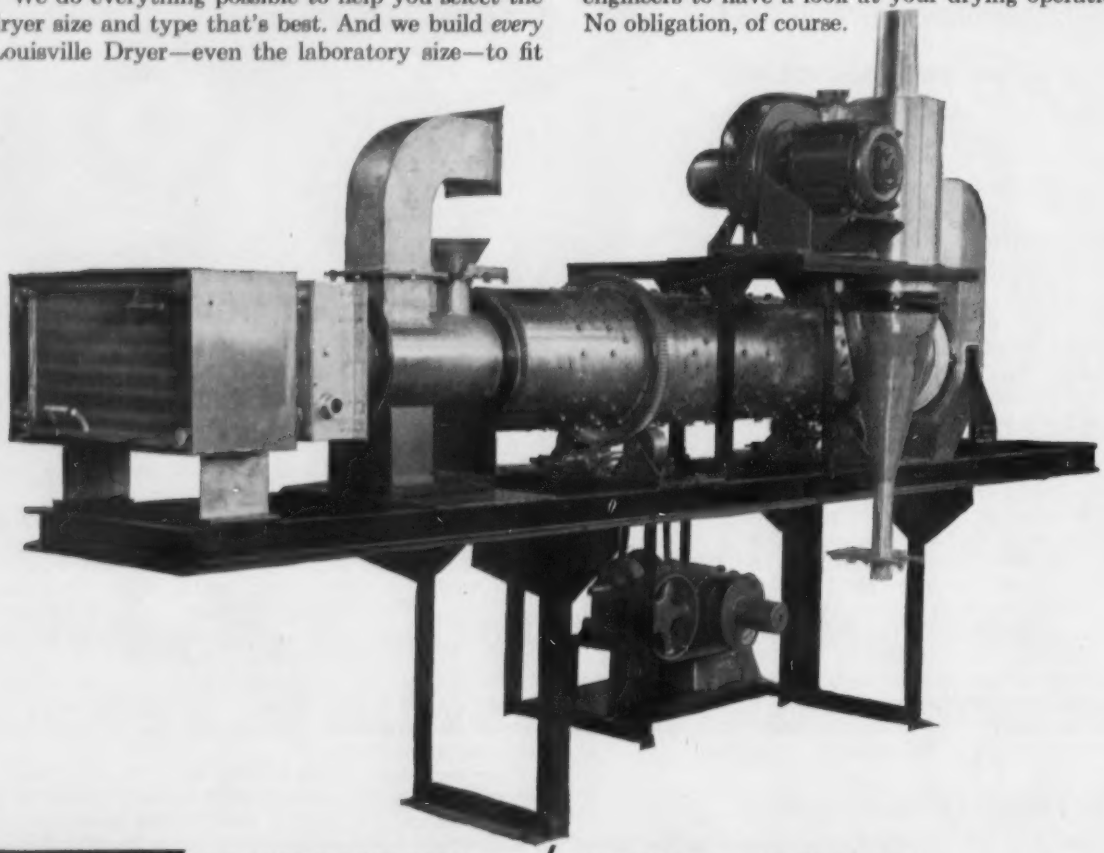

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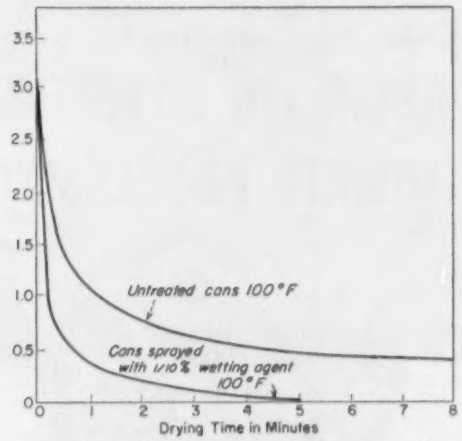


Fig. 1 Effect of wetting agent sprays on amount of water remaining on No. 2 cans after various drying times

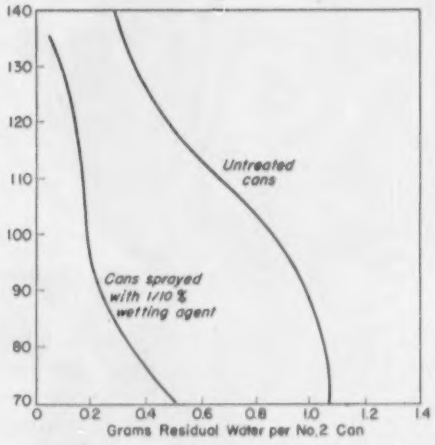


Fig. 2 Effect of wetting agent sprays on amount of water remaining on No. 2 cans after drying for two minutes at various temperature

Wetting Speeds Can-Drying

In many canneries, evaporation of water droplets from cooled cans is a problem. One way to accelerate drying after cooling is to spray the cans when they leave the cooler with a ½% solution of wetting agent.

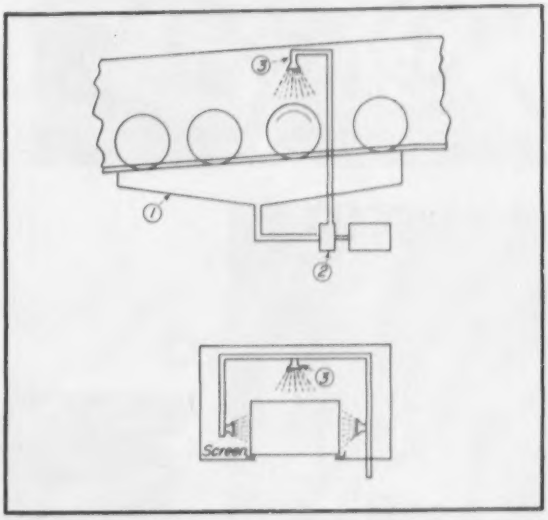
This will reduce the surface tension of the water, which then spreads over the can surface in a thin, more readily evaporated film.

Advantages of this procedure are twofold: First, existing cooling equipment may be utilized. Second, spraying with the wetting agent permits either shorter can-drying time (see Chart 1) or the alternative of cooling cans to a lower temperature (Chart 2) while still drying them in the same period of time as required when the cans aren't wetted.

Design of a spray unit for a single-line operation should include a 50-gal.-capacity tank—(1) in sketch—for collecting and holding the solution, also a small gear or centrifugal pump (2) capable of supplying the solution at 5 psi pressure to three full coned nozzles (3) with ⅛ in. orifices. Cans should roll through this spraying unit after emerging from the cooler.

Dilution of the wetting agent solution by residual water on cans will vary with the number and size of cans treated, therefore, small portions of concentrated wetting agent solution must be added from time to time.

No significant difference in effectiveness has been found between the various wetting agents available. Compounds of the type used in car-washing preparations seem most satisfactory, since they leave the dried cans unstreaked.—*J. A. Kitson and Jack A. Ruck, Food Section, Chemistry Div., Dept. of Agriculture, Summerland, B. C.*

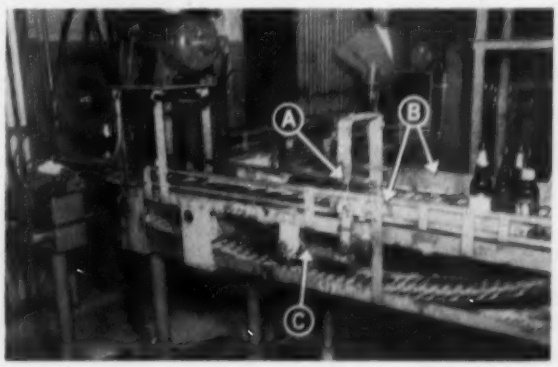


Divider for Bottle Conveyor

To accommodate the high capacity (850 cases/hour) of the Meyer-Dumore bottle uncaser at Falstaff Brewing Corp., San Jose, Calif., and also equalize the flow to two soaker-washers, a switch—(A) in photo—was installed to divide the flow.

Developed by Barry Wehmiller, switch is located in center of large conveyor leading from case unloader. It splits the bottle-flow evenly. And to prevent bottles from jamming here, two oscillating plates, (B), one each side of the conveyor, tend to revolve the bottles as they approach the switch so that they move freely from the large conveyor into the two lines feeding the soaker-washers.

Plates are driven by eccentric (C).—*FE Staff.*



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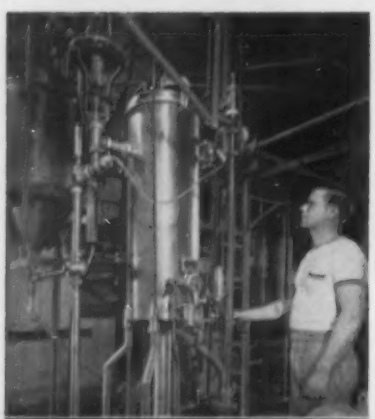
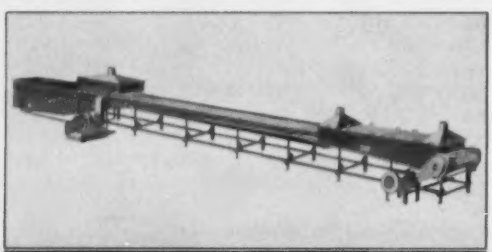
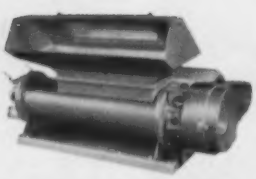


Deaerators Remove Harmful Oxygen



Continuous, Thorough Washing, Sorting & Scalding



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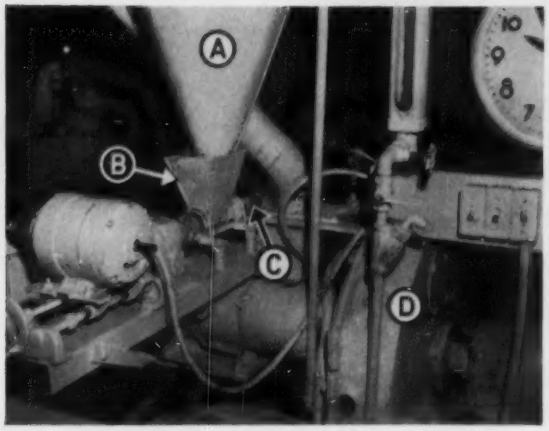
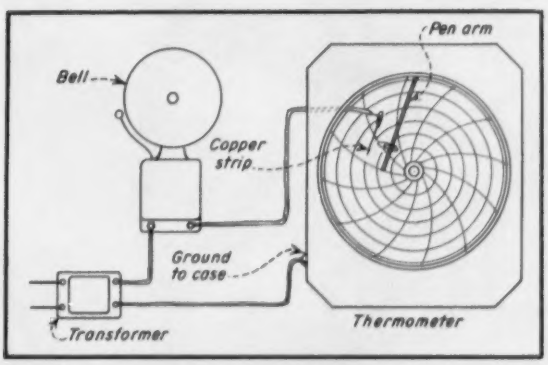


Hard Fat Proportioner

For years we added melted hydrogenated oil as a liquid, to our peanut butter, the proportion of the former measured by flowmeter. Then some of our customers insisted that hydrogenated product be added in flake form—their contention was that dispersion was thus improved.

To solve the problem of accurate proportioning of the dried fat, the hydrogenated flakes were first mixed with other solid ingredients in a ribbon-type mixer, then transferred, dispersed in the ingredients, to a cone-bottomed hopper— (A) in photo—which discharges into the feed trough (B) of a pressure type screw conveyor (C) approximately 1½ in. in diameter. This proportioning device which discharges into the stream of peanuts that feed the mill (D) is variable speed controlled to provide accurate proportioning.

Heat generated by milling is adequate to melt and disperse hydrogenated fat, thus eliminating separate operation of melting and holding fat in liquid form—*B. F. Fulton, Plant Engineer, Old Dutch Foods, Inc., Blasdell, N. Y.*



Curbs Pasteurizer Overheating

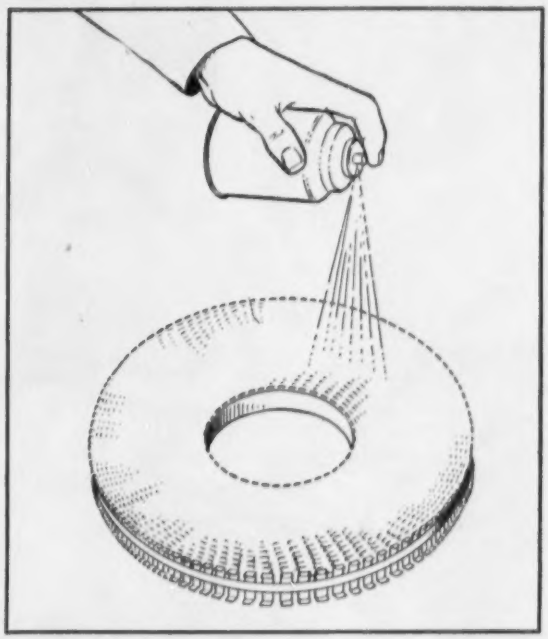
Occasional overheating of our pasteurizer resulted in off-flavored milk and was traced to unintentional carelessness of employees.

To put an end to this, we devised a very simple, but effective, warning signal from materials we had on hand—a small transformer, an electric doorbell, some bell wire, strips of lightweight thin-gaged copper, and a few paper clips.

First we ran insulated bell wire through the case of our Taylor recording thermometer. Then, after the insulation had been removed from the ends of the wire, the bare portion was bent to provide a hook on which to hang a small copper strip serving as a direct contact medium.

By means of the paper clips, we adjusted the wire so the copper strips would hang free at a point near the 143-deg.-F. marking on the chart. Then another paper clip was slid onto the pen arm to make contact with the copper strip when the desired temperature was reached, closing the circuit to ring the doorbell.

Though this arrangement is very simple, it has been surprisingly accurate when properly set. We now have one bell wired in tandem to two separate pasteurizers in our plant. The alarm bell can be sounded if the temperature in either one of the pasteurizers rises too high.—*Floyd Olderaudt, Lowville, N. Y.*



Clip-Coding Made Easy

Readily obtainable are Cryovac clips in rolls from which the individual clip can be simply detached for fastening as a means of code identification—except for applying the code itself.

Identity by days of the month, however, was efficiently introduced when a reel of clips (see sketch) was placed on a flat surface and lightly sprayed on the one side, using an aerosol paint bomb.

By changing tape color every other day, 24 working days (in pairs) per month can be coded, each two with a color of their own, identifiable by reference to a "file copy".

By adding or subtracting colors, this method of coding can be adapted for most any need.—*Millard S. Oscherwitz, I. Oscherwitz & Sons, Cincinnati.*

Air Vents Curb Oil Leaks

Leakage of oil at the shaft of an enclosed gear reduction unit is often attributable to air pressure resulting from elevated operating temperatures.

This difficulty can often be cured or reduced by use of

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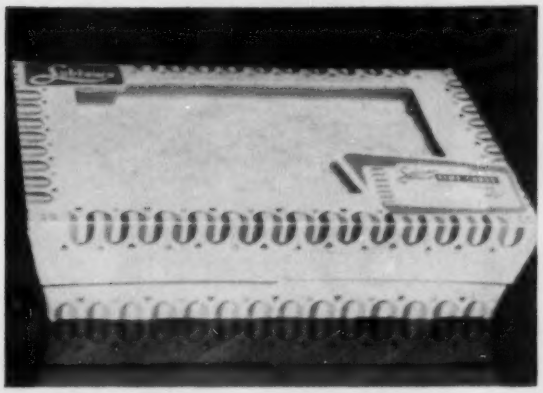
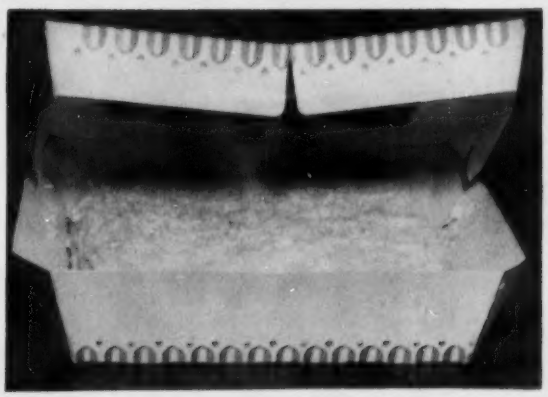
vents in those installations where these have not been provided.

The air vents should be equipped with filter caps and should be installed at the high point of the casing. If foaming causes oil leakage at the vents, this can usually be corrected by increasing the length of the vent pipe.—*Technical Bulletin, General Foods Corp.*





Designed Box to Fit Cake

The former conventional package for one of our bakery products gave considerable trouble until it was redesigned. The product was a cake, iced on top and all sides and then sprinkled with shredded cocoanut. As a result of handling in plant, in transit, and at retail outlets, sides of the cake were frequently stuck to the carton.

Then, specifically for this product, we designed a container (see top photo) with sloping sides to provide a carton larger at the top than at the bottom. However, since this was a folding type carton with transparent window in the top, we had difficulty forming a lid which would fit firmly over the rest of the carton, with its sloping sides.

This was accomplished, however, by slitting the vertical side (see lower photo) opposite the fold or hinge of the lid.

This carton now provides all the mechandising display values of the former carton and in addition protects the sides of the cake.—*Paul W. Hodler, Manager, Div., Loblaw, Inc., Buffalo, N. Y.*

Barrel Heads Coopered with Paper

Expensive but necessary were the material costs (barrel heads, etc.) and labor for coopering barrels of brined cherries, so that these containers and contents could be handled, transported or stored until processed.

We eliminated these costs by employing "paper cooperage" for protection of products during transportation and through short-time storage. Instead of using the conventional wooden barrel head, which is difficult and time-taking to install, we now place a sheet of Dri-Wrap paper (see photo) over the barrel top and secure it by pounding down on the top hoop. Dry-Wrap is a heavy, asphalt-impregnated laminated Kraft paper which does not tear or puncture easily.

It is not necessary to remove the paper when dumping products from the barrel. Instead, an operator merely slits the paper with two cuts in the form of an X and the product flows freely from the tilted barrel. Old papers are easily detached by removing the top barrel hoop.—*E. E. Jacobs, Vice President Lyons-Magnus, Inc., San Francisco.*

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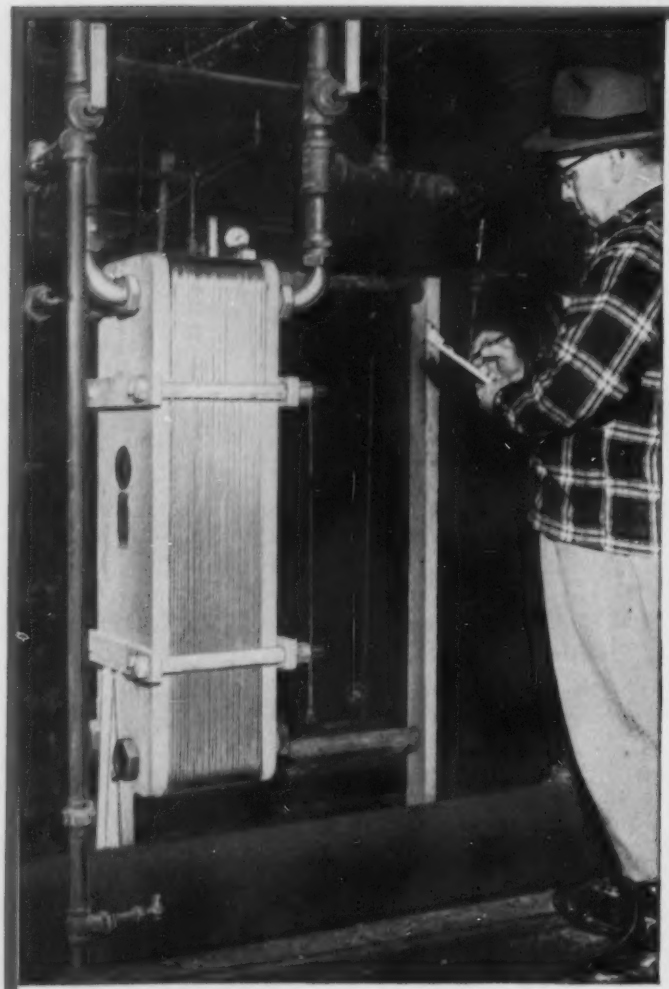
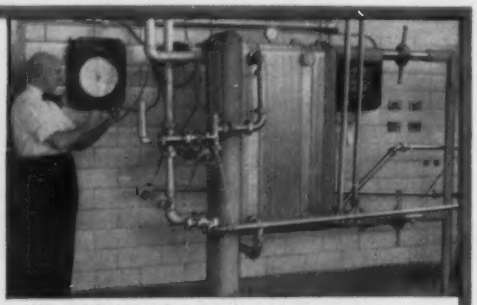
APRIL PRACTICAL IDEA WINNER was "Food Freezing Aids," sent in by Leonard W. Moore, Supervisor, Pictsweet Foods, Inc., Albany, Ore.

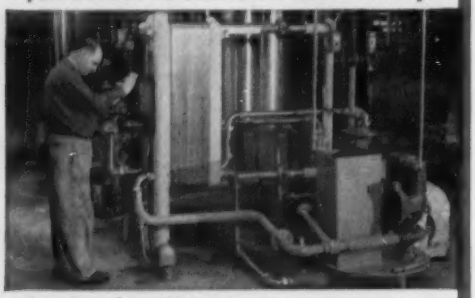
"5 times more cooling with less than half the cooling surface"



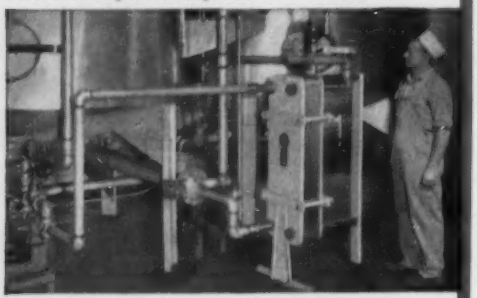
Irish Moss Filtrate Cooler. Mr. Neal F. Fogg checking performance of 30-plate "Superplate" heat exchanger cooling Irish Moss filtrates from 149° down to 90° F.



Liquid Sugar Pasteurizer. "Superplate" as a Shortime Pasteurizer in a soda syrup plant flash pasteurizes to 190°, then cools back for bottling.



Pre-Canning Heater. 1500-gallon-per-hour "Superplate" heat exchanger in a beverage plant, used as a pre-canning heater.



Chocolate Liquor Heater. 5000-pound-per-hour "Superplate" heats chocolate liquors to 250° for cocoa butter extraction process.

"Your 'Superplate' plate-type heat exchanger sure solved our cooling problem," says Neal F. Fogg, Plant Engineer of Algin Corp. of America. "We had two shell and tube heaters, but couldn't get enough temperature drop to cool Irish Moss filtrates to 90°.

"Clogging was a constant problem, too. Not to mention gasket blowouts due to pressure build-up.

"So we switched to 'Superplate' . . . easily get our needed 55° temperature drop . . . which is five times more cooling than we used to get with two coolers. Clogging no longer a problem. And our first year was 100% maintenance free."

Not just a cooler

Versatile "Superplate" heats, cools, regenerates and Shortime pasteurizes almost any liquid. Electropolished 304 or 316 stainless steel plates have from *two to five times more heat exchange surface per pound* of product than tubular exchangers.

"Superplate" saves money, too — through reduction of heating and cooling costs by regeneration . . . through elimination of product evaporation and shrinkage . . . through space savings.

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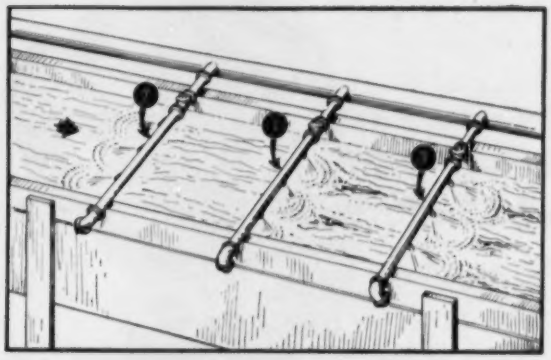


Washing Efficiency Improved

The size, quality, and condition of asparagus varies throughout the cutting season, so much so that it is important to be able to control the dwell-time in the washing flume.

Here's a simple way to increase or decrease agitation in the washer and control the washing effect and the time taken for washing:

Employed are sprays (see photo) attached to pipes suspended over the washer. Each pipe feeding from the header has its own plugcock cut-off. Now, just by changing the angle at which the water sprays engage the water in the flume washer, the extent of the agitation and also the direction of the water pressure can be changed.

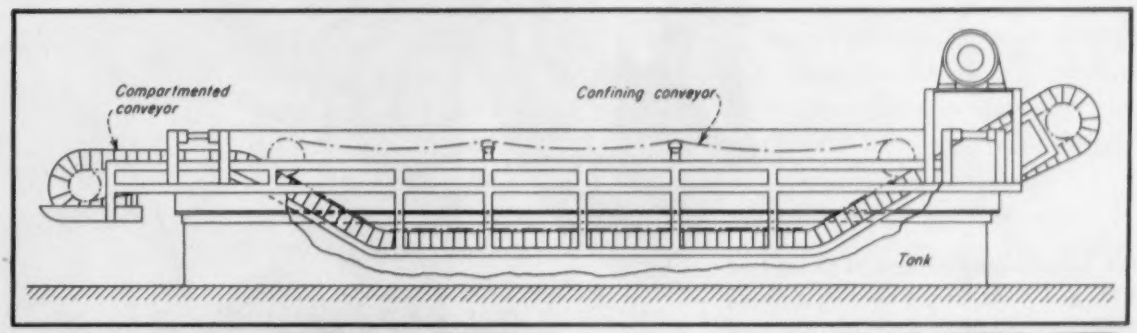
Aiming the sprays directly down—(1) in sketch—provides most severe agitation. Pointing the sprays back against the flow of the wash water (2) tends to slow the travel of the asparagus, providing less agitation, but prolonging the duration. Directing the spray nozzles in the direction the wash water is flowing (3) also cuts agitating effect, but speeds movement of the asparagus.—*FE Staff.*

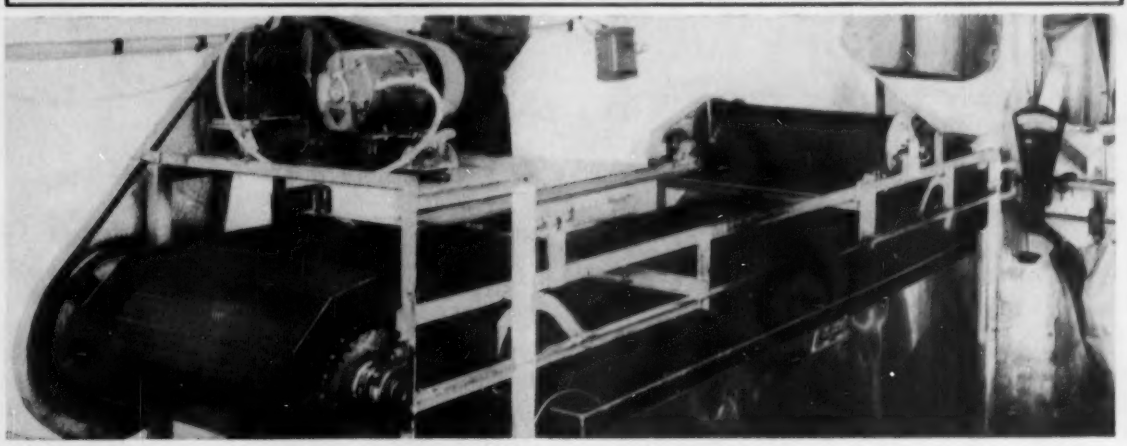
Better Gloss by Ruffling

Here's a simple way of obtaining more glossy highlights from the surface of confections enrobed with chocolate-type coatings:

You merely ruffle the surface of the coating as candy pieces emerge from the enrober and as they proceed to a cooling tunnel or multi-tier cooler. This ruffling can be carried out by machine or hand.

When cooled, there is a marked contrast in the glossy appearance of plain and unruffled coated pieces of candy. —*Justin J. Alikonis, Al-Chem Laboratories, Inc., Bloomington, Ill.*





Blancher Serves as French Fryer

To an eastern processor, the hot water blancher, jointly designed and fabricated by Cambridge Wire Cloth Co., Cambridge, Md., and A. K. Robins & Co., Inc., Baltimore, Md., had other possibilities.

Main blancher element is a woven-wire conveyor fabricated with upright sections on sides and across belt to form compartments. This unit (see sketch) transports products to be blanched, and travels down into, through a tank of heated water and up out of the other end.

During travel through the heated medium, product is confined in the belt compartment by a second wire-belt conveyor synchronized with, and resting on, the compartmented conveyor. Thus assured is submergence of the product in the heating medium for the time required.

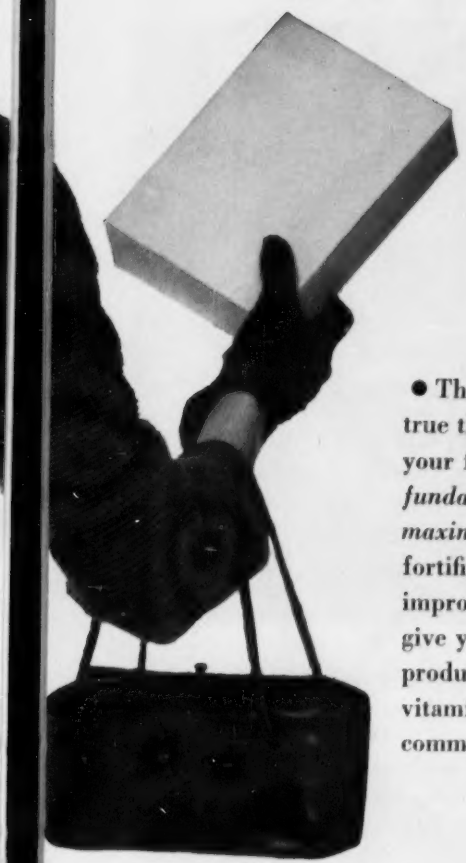
When heated vegetable oil was circulated through the tank and the French-fry sliced potatoes admitted to compartment, blancher (see photo) was found to function satisfactorily for processing French fried potatoes.—*FE Staff.*

Question . . .

Three of the many groups of foods and beverages that are increasing sales with Pfizer vitamin fortification and enrichment:

- You can give carbonated beverages health appeal for just a fraction of a cent per bottle. That's all Pfizer vitamin-fortification costs. Bottlers are already using Vitamins B_1 and C to boost sales to today's vitamin-conscious public. Vitamin B_{12}, a factor in child growth, is also being considered.
- It's a smart sales move to enrich flour, macaroni, corn meal and similar products with Pfizer BI-CAP® enrichment concentrates. They give such products more food value. Let Pfizer show you how BI-CAP can add sales appeal to your product.
- To fortify your sales position in the canned juice, concentrate and fruit "ade" market, fortify these products with Pfizer vitamins. "Vitamin Fortified" on your label is a strong sales inducement. What's more, your vitamin content is standardized to offset processing losses and seasonal variations.

• • • • What's the most powerful appeal to the food shopper?



Answer . . . Her family's health!

Here's how to put it in and on your package.

• There's something very basic about the grocery business that's so simple and true that it's often overlooked. More vital to the *permanent sales position* of your food product than all the temporary give-away promotions is *the fundamental desire of every homemaker to provide her family with the maximum in health-giving nourishment.* That's why Pfizer's vitamin fortification and enrichment program fits in so well with any contemplated improvements in your product. Your Pfizer sales representative is prepared to give you full details on how Pfizer vitamins can powerfully increase your product's sales potential. Remember that Pfizer has been a major vitamin research and production center since the first vitamin was commercially produced.

Manufacturing Chemists for Over 100 Years **Pfizer**

CHAS. PFIZER & CO., INC.

Chemical Sales Division

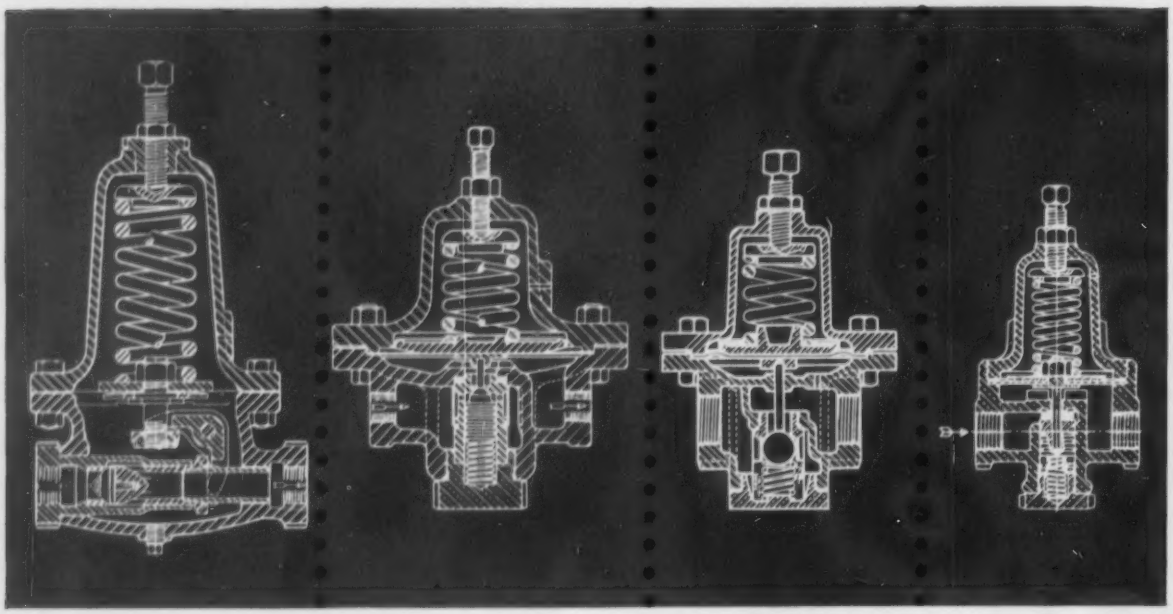
630 Flushing Ave., Brooklyn 6, N. Y.

Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.

What's your pressure problem?

CASH STANDARD

has the answer... *or will find one!*



HERE ARE FOUR TYPES FOR MANY APPLICATIONS

TYPE 1000 — A streamlined, high capacity valve for close pressure regulation — accurate even under toughest working conditions. Closes against the flow, eliminating conditions that cause chatter. Sizes: ¼" to 2", screwed ends. Bulletin 962.

TYPE D — A general purpose regulator with exceptional regulation characteristics. Now improved to permit easier servicing but basically the same dependable valve offered for over 35 years. Sizes: ¼" to 2". Bulletin 950.

TYPE 1260 — A high capacity pressure regulator, small and well proportioned. Available with spherical, self-cleaning inner valve. Suitable for air, water, steam, oil and most fluids and gases. Sizes: ½", ¾", 1", screwed ends. Bulletin S-700.

TYPE 3381 — A small, compact, all-bronze pressure regulator, very accurate and dependable. Available with pressure gauge mounted in one of the two outlet connections. For small lines. Sizes: ¼" and ⅜", screwed ends. Bulletin 948.

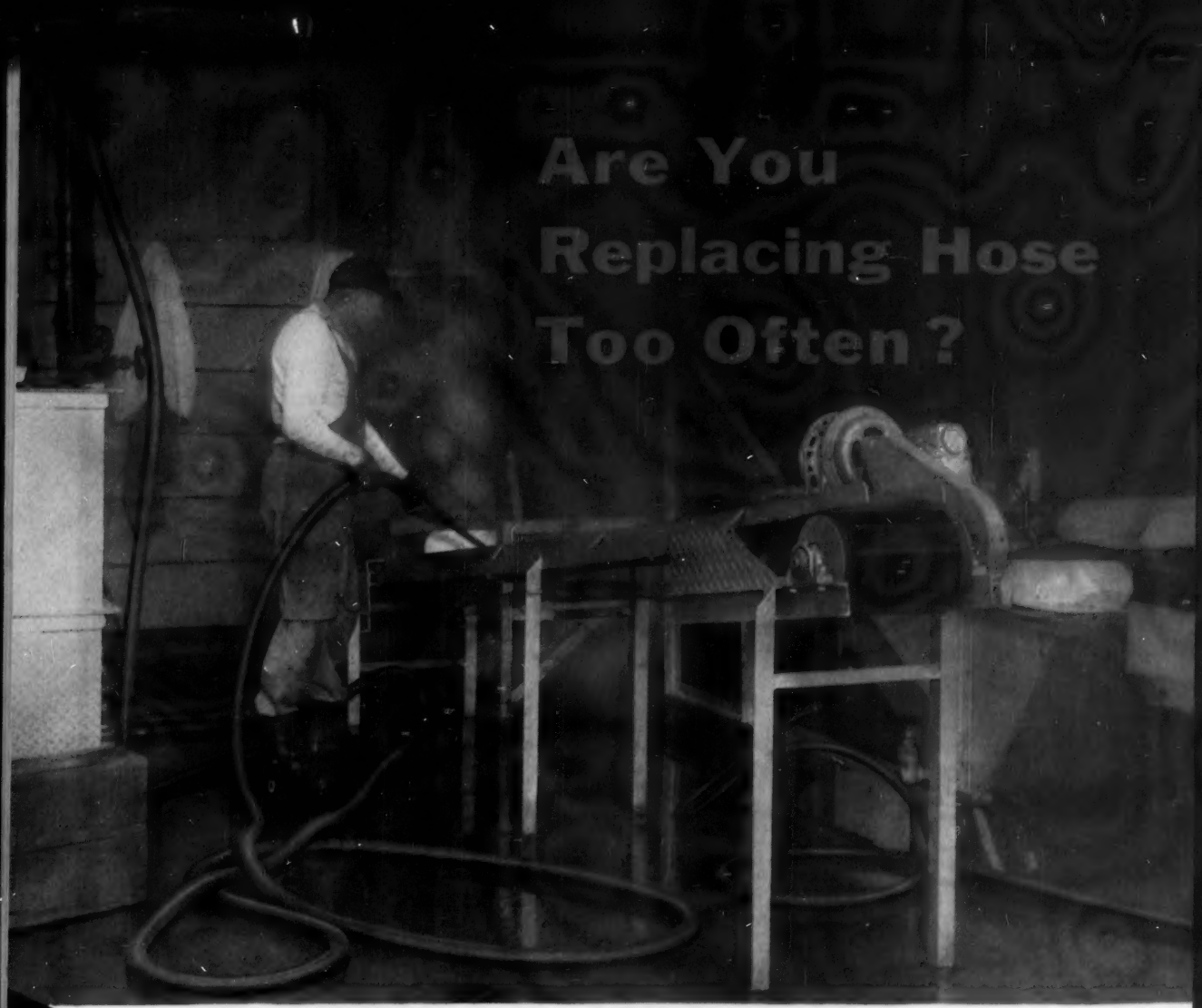
There's a Cash Standard regulator for every pressure control problem!

For an individual solution to your control problem, contact the Cash Standard control specialist in your area, or write Dept. A.

CASH STANDARD

A. W. CASH COMPANY, P. O. Box 551, Decatur, Illinois

Pressure, Hydraulic, Temperature, Process and Combustion Controls



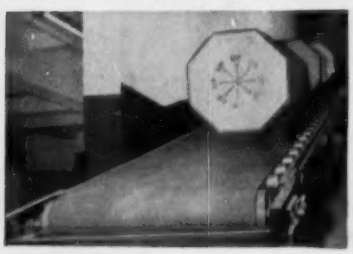
Better change to Thermoid as Bonner Packing Company did!

This California packer of raisins, figs and apricots was replacing steam hose on an average of every six months. Then they tried Thermoid Powerflex Wire Braid Steam Hose.

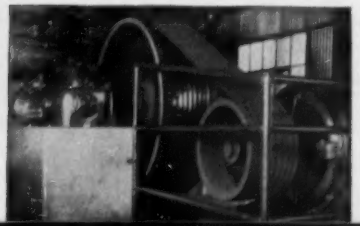
Thermoid engineers know the beating that steam gives hose. And they've designed Powerflex Wire Braid to take it! At Bonner Packing Company, this powerfully reinforced 1"x2 braid hose is still on the job after 18 months, with still no signs of need for replacement.

There's a Thermoid Hose built to give you longer service and maximum economy in your specific application. It will pay you to get in touch with your Thermoid Distributor, or write direct for his name and a copy of our latest Hose Catalog.

Cut costs with Thermoid Conveyor Belting . . .



. . . and Thermoid Multi-V Belts

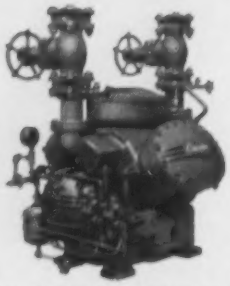


Thermoid

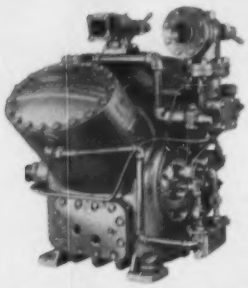
Thermoid Company, Trenton, N. J.

Carrier offers you these quality products

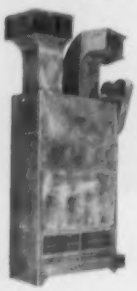
for dependable ammonia refrigeration



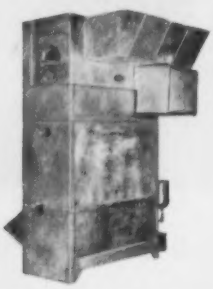
5F and 5H Series Ammonia Reciprocating Compressors — in ranges of 5 to 75 hp. Four, six, eight or 12 cylinder models, depending on duty. For moderate size commercial applications in breweries, dairies, meat packing, ice making, food freezing, food storage and product processing. Compressors may be direct connected, geared or belt driven.



5J Series Ammonia Reciprocating Compressors — heavy-duty, single-acting refrigerating compressors for large commercial and industrial applications. Compactly designed. Ruggedly built. Four and six cylinder models have ranges of 75, 100, 125, 150 and 200 hp and may be direct connected, geared, or belt driven by electric motors, turbines, diesel or gas engines.



15 Series Ammonia Cold Diffusers — for product cooling, freezing and storage at medium and low temperatures. Control temperatures and moisture to retain natural color, flavor and freshness of perishables. Spray-coil diffusers available with nominal fan capacities of 5350 to 18,300 cfm. Dry-coil diffusers in capacities of 6800 to 22,800 cfm.



9E Ammonia Evaporative Condensers — fan-coil type refrigerant condensers for use with refrigerating compressors to supplant water-cooled condensers and cooling towers. An efficient and economical means of heat disposal where water supply and drainage problems exist. Sturdy, compact, sectionalized units for indoor or outdoor location. Capacities to 110 tons.

Centrifugal Ammonia Refrigerating Machines — for direct compression of ammonia gas in capacities up to 5000 tons and for ammonia condensing systems up to 2000 tons in a single unit. For applications requiring large-capacity refrigeration such as brewing, meat packing, chemical processing, etc. Designed for use with electric motor or steam turbine.

For the *best* ammonia refrigeration equipment, call your nearest Carrier office. Or write direct to Carrier Corporation, Syracuse, New York.

Carrier

AMMONIA REFRIGERATING SYSTEMS

Delicious Colors for every purpose

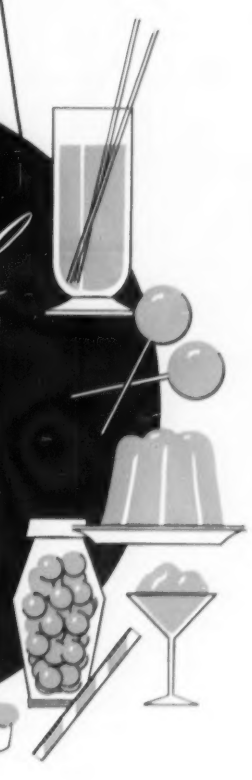
What looks good, tastes good . . . and vice versa. No other ingredient adds so much appetite appeal as a tinge of added color to emphasize the inherent goodness of your products.

For many, many years National Certified Food Colors have been used with complete satisfaction by the most respected concerns in the food and beverage industry. We produce a long line of Primary Colors and Blends, each precisely standardized as to shade, pure-dye strength and composition. We render very practical help in formulating colors for new products or reformulating shades for existing lines.

For your color needs, it pays to call National Aniline first.

Write for your copy of the informative National Certified Color Catalog giving helpful information on blends for popular food-color shades, suggestions on the preparation and care of stock solutions for various food products and other useful data.

National
CERTIFIED
FOOD COLORS



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NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION • 40 RECTOR ST., NEW YORK 6, N. Y.
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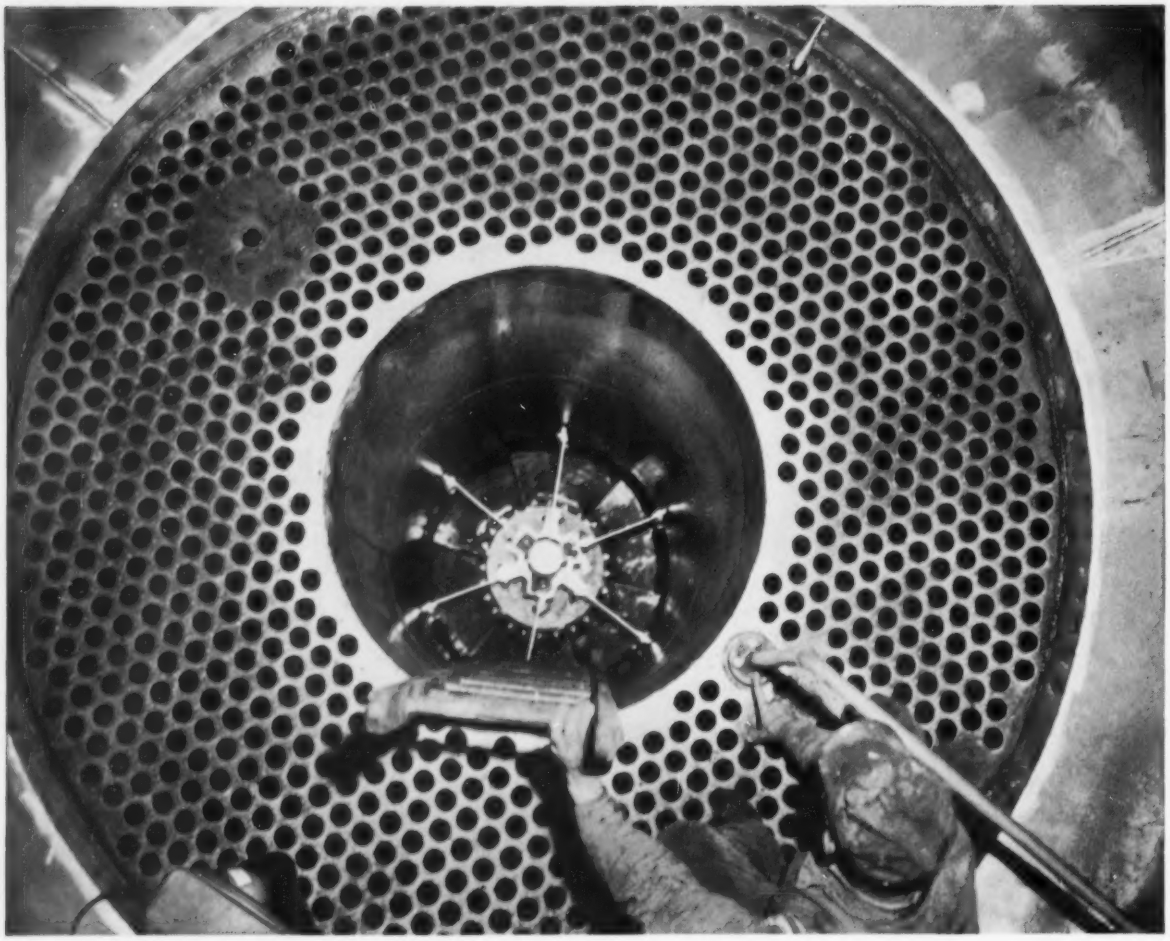


Switching to *Carpenter* Stainless Tubing pays off 5 ways!

How can *you* use the five advantages gained by a prominent distillery when it changed to Carpenter Stainless Tubing for a new stillage evaporator?

Twice the service life . . . greater operating efficiency . . . lighter weight . . . greater carrying capacity . . . and a higher cost-life ratio are the proven results obtained with more than a mile of Carpenter Stainless Tubing in this evaporator.

Additional proof of how Carpenter quality pays off on job after job is available from your Carpenter Distributor. Discover the profitable difference Carpenter can make on your own processing and transfer lines, evaporators, heat exchangers and similar applications.

Talk to your Carpenter Distributor now about cost-savings you may be able to obtain by switching to Carpenter Stainless Tubing or Pipe. Remember, you are sure of getting the highest possible degree of perfection in Carpenter tubing because it must pass the most exacting non-destructive test ever applied to stainless tubing.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N.J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

CHAIN NEWS!

NEW "*Electrolized*" ATLAS ROLLER CHAIN

NON-CORROSIVE . . . COSTS 40% LESS

Here's a revolutionary new roller chain developed to meet the most exacting requirements of the chemical, food, bottling and other industries where corrosion is an important factor. Stands the most severe torture tests . . . meets and beats A.S.C. specifications . . . yet costs far less.

STAINPROOF, CORROSIVE RESISTANT Electrolized parts came through severe salt spray corrosion tests with flying colors . . . last as much as 800% longer.

HIGHER TENSILE STRENGTH Has same tensile strength as alloy steel chain . . . much higher than bronze or stainless steel chain.

WEARS LONGER Friction of parts has been reduced by more than 50% . . . wear cut to a minimum . . . chain life greatly increased.

LOWER PRICE Atlas Electrolized Roller Chain is as much as 40% lower in price than any other corrosion resistant chain now on the market.

TESTED AND PROVED!

This new Atlas Electrolized Chain has been torture-tested on installations and tested in laboratories. It has successfully resisted the corrosive action of acetic acid, cola syrup, beer, bleaching powder, blood, buttermilk, citric acid, hydrogen peroxide, salt, sugar cane juice, nitric acid, sulphuric acid and other corrosive elements.

Get the facts on this new chain for the food, confectionery, beverage, dairy products and bottling industries. Write to Atlas Chain & Manufacturing Co., West Pittston, Penna. Act now and . . .

SEND THIS COUPON FOR SAMPLE

Please send sample of Atlas Electrolized Chain and data to—

NAME_____ TITLE

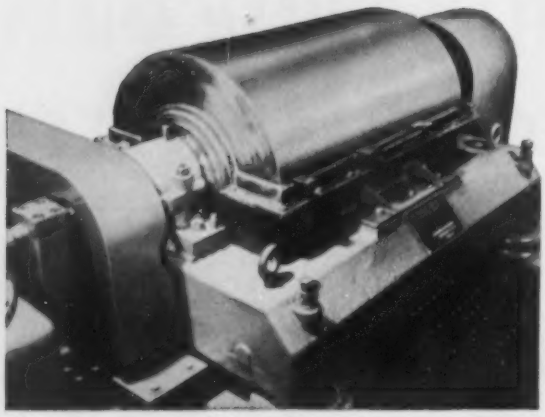
COMPANY_____

ADDRESS_____

The Answer to

BETTER DE-PULPING
HIGHER JUICE RECOVERY
SUPERIOR CLARITY

The Sharples
HIGH SPEED **Super-D-Canter**
(4000 rpm)



The 4000 rpm Sharples Super-D-Canter is setting new standards in the continuous removal of fibrous or coarse solids, and fine pulp, from a wide variety of fruit, vegetable, and proteinaceous juices and slurries—*without limitations of particle size.*

Whether you need a sparkling clear juice or dewatered pulp, the extra values of higher speed and higher centrifugal force are at your command—and the results can be eye-opening.

We'd be glad to discuss your application with you. A copy of Sharples Bulletin 1254 will be sent by return mail.

SHARPLES

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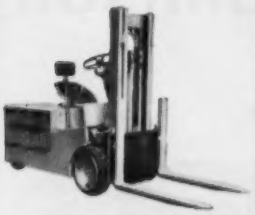
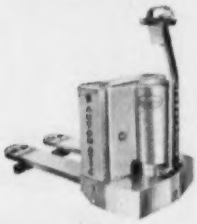
Associated Companies and Representatives throughout the World

DOCKER
Capacities:
1000 to 3000 lbs.



LOW-PROFILE
SKYLIFT
Capacities:
1000 to 4000 lbs.



ALL NEW
TRANSPORTER
(Pallet Model)
4000 and 6000 lbs.

RETRACTABLE-MAST
TRANSVEYOR
Capacity:
Up to 4000 lbs.

For Low Cost, Fumeless Handling of Foods... Automatic Trucks

Automatic Electric-Driven Trucks Cost Less Per Year To Own and Less to Operate... Less Down Time ...Emit No Food-Contaminating Gases

One reason why Kraft Cheese Company uses Automatic Electric Trucks as pictured above is the complete absence of exhaust gases which would ruin the delicate flavor of their cheese. This is important wherever odor-sensitive foods are present but it is only one of many reasons why Automatic Trucks are so highly favored for handling foods or any other commodities.

No less important is the low per-annum cost of owning Automatic Trucks also their exceptional economy. Low electric charging costs and a minimum of moving parts to wear out mean less down time and definitely lower operating costs. But there are many more reasons that can be told here. Why not get all the facts?

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For more data, circle this page number on card at front →

When You Need a Kettle Quick!

Hamilton Kettles Choice for New Howard Johnson Commissary . . .

Fred W. Scott, manager, reports, "We've tried all types . . . and we believe that Hamilton kettles are the finest, most efficient on the market." Recently installed kettles: one 200 gallon style CG Mix Cooker, three 300 gallon style SA kettles.

The new Howard Johnson Food Commissary, Miami, Florida, selected Hamilton Kettles for fast cooking, sanitary design and stainless steel construction.

Chef O. E. Rathfeldt likes the way Hamilton's extra large kettle diameter gives fast cooking, increases production. He also says streamlined, sanitary design makes equipment easy to clean, saves valuable down time, and the stainless steel construction protects against corrosion, guarantees unusually long kettle life.

More and more food commissaries, meat packers, canners and other members of the food processing industry are turning to Hamilton for fine kettles and prompt service. For information on the complete line of Hamilton Kettles, call Paul Hock, GRandview 1-4110 or write.

HAMILTON COPPER & BRASS WORKS

Division of the Brighton Corporation **824 State Avenue** **Cincinnati 4, Ohio**

For Your Fact File!

CUT OUT HERE

COMPARATIVE REFRIGERANT CHARACTERISTICS OF genetrons® AND OTHER BASIC REFRIGERANTS

(PERFORMANCE BASED ON 5°F EVAPORATOR TEMPERATURE AND 86°F CONDENSER TEMPERATURE)

	genetron 11 Trichloro-monofluoro-methane	genetron 12 Dichloro-difluoro methane	genetron 141 Monochloro-difluoro methane	genetron 226 Trichloro-trifluoro-ethane	Carrene 7	Methyl Chloride	Ammonia	Sulfur Dioxide
Chemical Formulae	CCl_3F	CCl_2F_2	$CHClF_2$	$C_2Cl_3F_3$	Note 1	CH_3Cl	NH_3	SO_2
Molecular Weight	137.4	120.9	86.5	187.4	99.3	50.5	17.0	64.1
Boiling Pt. (°F) at 1 Atmosphere Pressure	74.7	−21.6	−41.4	117.6	−28.0	−10.8	−28.0	14.0
Evaporator Pressure at 5°F (p.s.i.g.)	24.0*	11.8	28.3	27.9*	16.4	6.5	19.6	5.9*
Condensing Pressure at 86°F (p.s.i.g.)	3.6	93.2	159.8	13.9*	113.4	80.0	154.5	51.8
Freezing Point (°F) at 1 Atmosphere Pressure	−168	−252	−256	−31	−254	−144	−108	−104
Critical Temperature (°F)	388	233	205	417	221	289	271	315
Critical Pressure (p.s.i. absolute)	635	582	716	495	631	969	1657	1142
Compressor Discharge Temperature (°F)	112	100	131	86	105	172	210	191
Compression Ratio (86°F/5°F)	6.24	4.07	4.06	8.02	4.12	4.48	4.94	5.63
Saturated Liquid Viscosity at 5°F (centipoises)	0.650	0.328	0.286	1.200	—	0.293	0.250	0.503
Saturated Liquid Viscosity at 86°F (centipoises)	0.405	0.251	0.229	0.619	—	0.234	0.207	0.281
Vapor Viscosity at 5°F & 1 Atmosphere Pressure (centipoises)	0.0096	0.0114	0.0114	0.0093†	—	0.0095	0.0085	0.0111
Vapor Viscosity at 86°F & 1 Atmosphere Pressure (centipoises)	0.0111	0.0127	0.0131	0.0105†	—	0.0109	0.0102	0.0131
Saturated Liquid Density at 5°F (lbs./cu.ft.)	97.88	90.00	83.34	103.20	80.11	61.65	41.11	92.00
Saturated Liquid Density at 86°F (lbs./cu.ft.)	91.38	80.63	73.36	96.96	71.23	56.24	37.16	84.44
Saturated Vapor Density at 5°F (lbs./cu.ft.)	0.0815	0.6735	0.8034	0.0370	0.657	0.2237	0.1227	0.1558
Saturated Vapor Density at 86°F (lbs./cu.ft.)	0.4461	2.569	3.213	0.2569	2.598	0.9253	0.5643	0.8440
Specific Volume of Saturated Vapor at 5°F (cu.ft./lb.)	12.27	1.49	1.25	27.04	1.52	4.47	8.15	6.42
Latent Heat of Vaporization at 5°F (B.t.u./lb.)	84.0	69.5	93.6	70.6	—	180.7	565.0	169.4
Net Refrig. Effect of Liquid (86°F/5°F) (B.t.u./lb.)	67.5	51.1	69.3	53.7	61.1	150.2	474.4	141.4
Specific Heat of Liquid at 86°F (B.t.u./lb. °F)	0.21	0.24	0.34	0.22	—	0.39	1.14	0.39
Specific Heat of Vapor at Constant Pressure of 1 Atmosphere & 86°F (B.t.u./lb.°F)	0.13	0.15	0.15	0.15	—	0.24	0.51	0.15
Specific Heat Ratio at 86°F & 1 Atm. (k=Cp/Cv)	1.14	1.14	1.18	1.09	—	1.20	1.32	1.29
Coefficient of Performance	5.09	4.70	4.66	4.92	4.61	4.90	4.76	4.87
Horsepower/Ton Refrigeration	0.927	1.002	1.011	0.960	1.022	0.962	0.989	0.968
Refrigerant Circulated/Ton Refrig. (lbs./min.)	2.96	3.92	2.89	3.73	3.27	1.33	0.422	1.41
Liquid Circulated/Ton Refrig. (cu.in./min.)	56.0	83.9	68.0	66.5	79.3	40.9	19.6	28.9
Compressor Displacement/Ton Refrig. (c.f.m.)	36.32	5.81	3.60	100.76	4.97	5.95	3.44	9.09
Thermal Conductivity of Saturated Liquid at 32°F (B.t.u.ft./ft.²hr. °F)	0.0680	0.0559	0.0704	0.0576	—	0.103	0.29	0.122
Thermal Conductivity of Saturated Liquid at 86°F (B.t.u.ft./ft.²hr. °F)	0.0609	0.0492	0.0595	0.0521	—	0.089	0.29	0.111
Thermal Conductivity of Vapor at 32°F & 1 Atm. Pressure (B.t.u.ft./ft.²hr. °F)	0.0045	0.0048	0.0060	0.0038‡	—	0.0053	0.0128	0.0050
Thermal Conductivity of Vapor at 86°F & 1 Atm. Pressure (B.t.u.ft./ft.²hr. °F)	0.0048	0.0056	0.0068	0.0045‡	—	0.0065	0.0145	0.0056
Stability (Toxic Decomposition Products)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Toxicity (Underwriters' Laboratories Group No.)	5A	6	5A	4-5	5A	4	2	1
Flammability	None	None	None	None	None	Yes	Yes	None
Relative Dielectric Strength of Vapor (compared with Ethyl Chloride as Unity)	3.00	2.40	1.31	2.60	—	1.06	0.82	1.90
Odor	Ethereal	Ethereal	Ethereal	Ethereal	Ether.	Ether.	Acrid	Acrid
Type of Compressor in Which Usually Used	Cen.	All	Rec-Rot	Cen.	Rec-Rot	All	All	Rec.
Evaporator Temperature Range, °F	−20 to 50	−100 to 50	−125 to 50	−25 to 50	−100 to 50	−80 to 50	−90 to 20	−60 to 50
Water Sol. in Liq. Refrig. at 32°F (gms./100 gms. Refrig.)	0.0036	0.0026	0.060	0.0036	—	0.026 at −10°F	High	High
Water Sol. in Liq. Refrig. at 86°F (gms./100 gms. Refrig.)	0.013	0.012	0.15	0.013	—	—	High	High
Oil Solubility (Miscibility With Lubricating Oils)	Yes	Yes	Partial	Yes	Yes	Yes	No	No

*Inches of mercury vacuum †At. 0.1 atmosphere ‡At. 0.5 atmosphere

Note 1. Carrene 7 is an azeotropic mixture of Genetron 100(CH_2CHF_2) and Genetron 12(CCl_2F_2)

Genetron Super-Dry Refrigerants are available from Refrigeration Wholesalers throughout the country.

GENERAL CHEMICAL DIVISION • ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

New!

BAUSCH & LOMB
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LIGHT
LOOK
REFRACTOMETER

ABBE-3L

Just LOAD-LIGHT-LOOK!

Top accuracy refractometry in seconds!

SEE FOR YOURSELF IN FREE LABORATORY DEMONSTRATION

Write today for demonstration in your own lab, at your convenience . . . and for informative Catalog D-280. Bausch & Lomb Optical Co., 60306 St. Paul Street, Rochester 2, New York.

EASIEST OPERATION EVER! Front, horizontal loading. Fixed prism assembly . . . wipes clean in a wink. DUO-SPEED control knob . . . rapid scanning and fine line setting at the touch of a finger.

FASTEST, TOP ACCURACY READINGS! New instant-reading precision scale, graduated directly to .0005. Quick, easy estimates to .0001.

ASSURES FULL-WORKING-DAY COMFORT! Eyepiece at convenient height and angle for relaxed sitting-position observation; DUO-SPEED control knob and line-scale switch in low position for hand-at-rest operation.

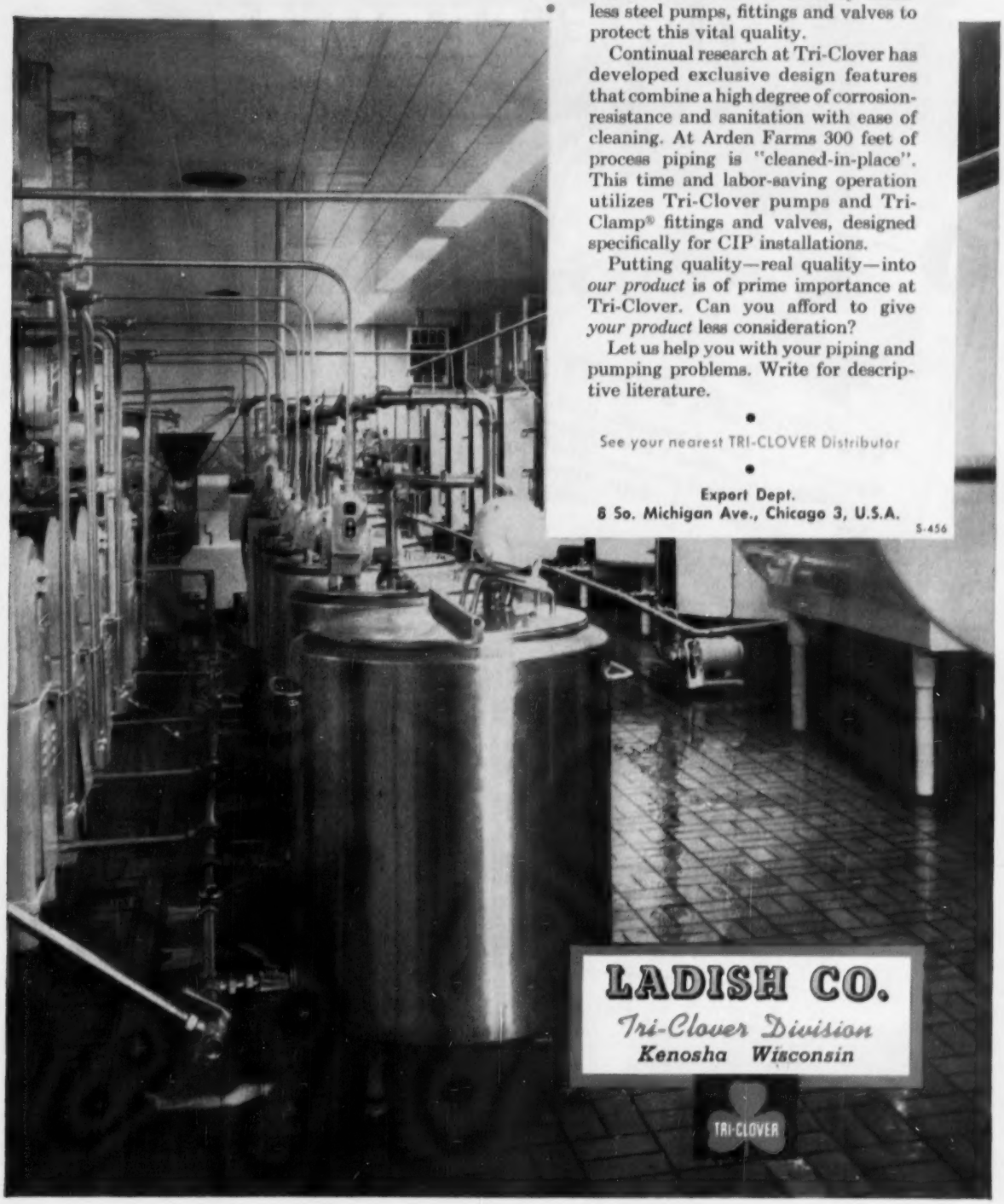
PLUS . . . many other new features and new performance advantages setting the new standard for high-speed, high-accuracy refractometry. Find out now how they can ease your work load.

BAUSCH & LOMB
SINCE B&L 1853

America's only complete optical source . . from glass to finished product.

There is no substitute for QUALITY

Ice Cream producers protect product quality with* TRI-CLOVER *Pumps and Fittings



The constant high quality of ice cream products results in continued customer satisfaction and repeat order business. Arden Farms Co. of San Leandro, California, is one of many modern ice cream plants employing Tri-Clover Division's sanitary stainless steel pumps, fittings and valves to protect this vital quality.

Continual research at Tri-Clover has developed exclusive design features that combine a high degree of corrosion-resistance and sanitation with ease of cleaning. At Arden Farms 300 feet of process piping is "cleaned-in-place". This time and labor-saving operation utilizes Tri-Clover pumps and Tri-Clamp® fittings and valves, designed specifically for CIP installations.

Putting quality—real quality—into *our product* is of prime importance at Tri-Clover. Can you afford to give *your product* less consideration?

Let us help you with your piping and pumping problems. Write for descriptive literature.

•

See your nearest TRI-CLOVER Distributor

•

Export Dept.
8 So. Michigan Ave., Chicago 3, U.S.A.

S-456

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

For more data, circle this page number on card at front →

Sterwin offers "TRIPLE" SERVICE

to help the Food Industry produce better products

1

Products and Delivery

Most complete line of Vitamins, U.S.P., Vanillin, U.S.P., Certified F.D.&C. Colors. Any quantity—when you want them—where you want them. Quick delivery from branches in 11 cities covering the United States and Canada.

2

Research and Testing

Sterwin customers served by huge Sterling-Winthrop Research Institute . . . one of the world's largest research laboratories. Constantly working to improve existing products . . . and to originate new products and processes.

3

Technical Sales Service

"On the spot" service based on years of technical and practical experience. Supplemented by home office service staff and Sterwin Research.

TIME AND AGAIN Sterwin Service, Products and Research have enhanced a good product's salability by adding more taste-appeal, eye-appeal, health-appeal. Find out how Sterwin men, materials and methods can help you.

CONTACT YOUR STERWIN REPRESENTATIVE OR WRITE DIRECT TO:

Sterwin Chemicals INC.

Subsidiary of Sterling Drug Inc.

1450 BROADWAY, N. Y. 18, N. Y.

It's NEW! It's Revolutionary!

Ever see a steam trap

SO SMALL

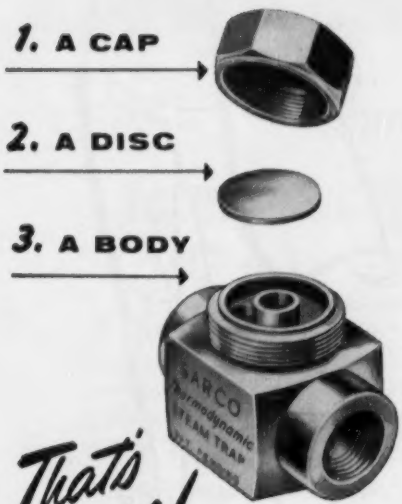
SO SIMPLE

SO TROUBLE-FREE!

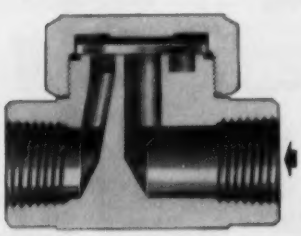
1. A CAP

2. A DISC

3. A BODY



That's all!



YES, SO TROUBLE-FREE: No valve-closing mechanism to wear or stick—the kinetic energy of steam closes valve. No critical clearances to choke. No gaskets to leak.

Practically Eliminates Maintenance!

Here's the *smallest*...the most *compact*...the most *durable* steam trap you've ever seen...for all-around trapping effectiveness! It's the new Sarco Thermodynamic trap.

Look at it. So small...it fits into the hollow of your hand. So simple...only 3 rugged parts...machined from stainless steel bar stock. So trouble-proof...only moving part, a hardened solid stainless steel disc, practically immune to wear. Not affected by superheat, water-hammer, corrosive condensate.

Use the SAME trap for 10-600 psi...for light or heavy loads ...without seat or valve change or other adjustments. Closes tight on no load—no steam waste.

Ask for a 60 day trial installation of Sarco TD trap and strainer...write for bulletin 257. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

S149-B

SARCO

Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.

uniformly fine flavor

Don't give normal seasonal or regional variations in flavor a second thought when you use MSG (pure mono sodium glutamate) in food processing and preparation.

MSG controls the over-all flavor features of quality protein foods. By blending and strengthening their naturally fresh taste MSG can create a uniform flavor identity the consumer recognizes. It is economical and easy to use.

Always rely on Great Western MSG to accentuate and maintain the fine fresh flavor characteristics of your product. Insure *uniform flavor-quality* to develop dependable customer brand preference.

Discover **"The Secret of Good Taste"** *—Try Great Western's*

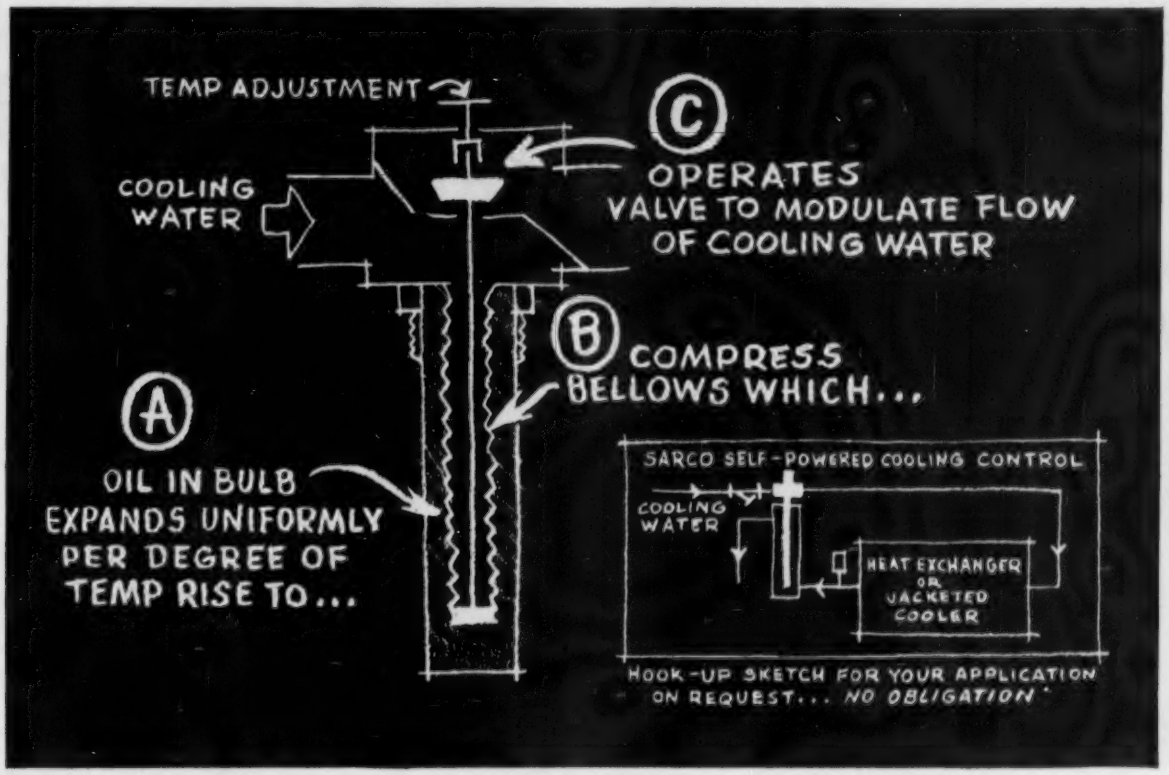
GREAT WESTERN
MSG
99+% Pure Mono Sodium Glutamate Crystals

in: vegetables, meats, canned soups, poultry, seafood, sauces, gravies, seasonings, and frozen foods.

A Product of
AMERICAN AGRICULTURE

We invite inquiries from current and prospective users of MSG

THE GREAT WESTERN SUGAR COMPANY
Denver, Colorado


TEMP ADJUSTMENT
C
OPERATES VALVE TO MODULATE FLOW OF COOLING WATER
COOLING WATER
B
COMPRESS BELLOWS WHICH...
A
OIL IN BULB EXPANDS UNIFORMLY PER DEGREE OF TEMP RISE TO...
SARCO SELF-POWERED COOLING CONTROL
COOLING WATER
HEAT EXCHANGER OR JACKETED COOLER
HOOK-UP SKETCH FOR YOUR APPLICATION ON REQUEST... NO OBLIGATION

Simple, inexpensive way to end waste and hazards of overcooling

WHEN cooling water is manually controlled ...the operator is forced to play it safe by leaving the water valve wide open to compensate for variables in the load and water pressure and temperature. Result—*overcooling*. If he tries to vary the flow of water...he risks *undercooling*.

It pays to take responsibility off the operator's shoulders. Optimum *safe* temperature can be automatically assured by using Sarco Cooling Controls. They eliminate both overcooling and undercooling. They replace guesswork with certainty. Save man-hours and cooling water. Prevent damage to equipment.

Simple and Trouble-Free

Simple, trouble-free design—as you can see above, a temperature control need not be complicated! Self-powered...no electricity or compressed air required. Self-contained...no exposed mechanism. Packless...no packing to wear or leak.

Each year, thousands of these fully modulating and sensitive Sarco Controls provide dependable service for firms such as Ingersoll-Rand, Butler Manufacturing Co., and Swift & Co.

Low Price

The low price makes it possible for you to use Sarco AUTOMATIC temperature controls for ALL control jobs, not just the big ones! For example, the ¾" size costs only about $39! Mail the coupon now.

SARCO

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.
Please send information on your simple, inexpensive Self-Powered Cooling Controls for use on_____

Name_____
Firm_____
Address_____
City_____ State_____

A180-B

For more data, circle this page number on card at front →

Crucible stainless steel, type 304, is used throughout this Sparkler standard horizontal plate filter.

Constant filtration of chemicals, pharmaceuticals, foods and liquids subject this horizontal plate filter to pretty rugged corrosive, abrasive and temperature conditions. That's why Sparkler Manufacturing Co. uses all-stainless steel construction.

For stainless, first of all, fights off corrosive attack. And it's strong. Stainless becomes tougher the more it's used . . . which is another way of saying that, with stainless, abrasion is no problem. And neither is cleaning. For stainless steels' smooth, bright surface comes clean with a minimum of effort . . . stays clean longer.

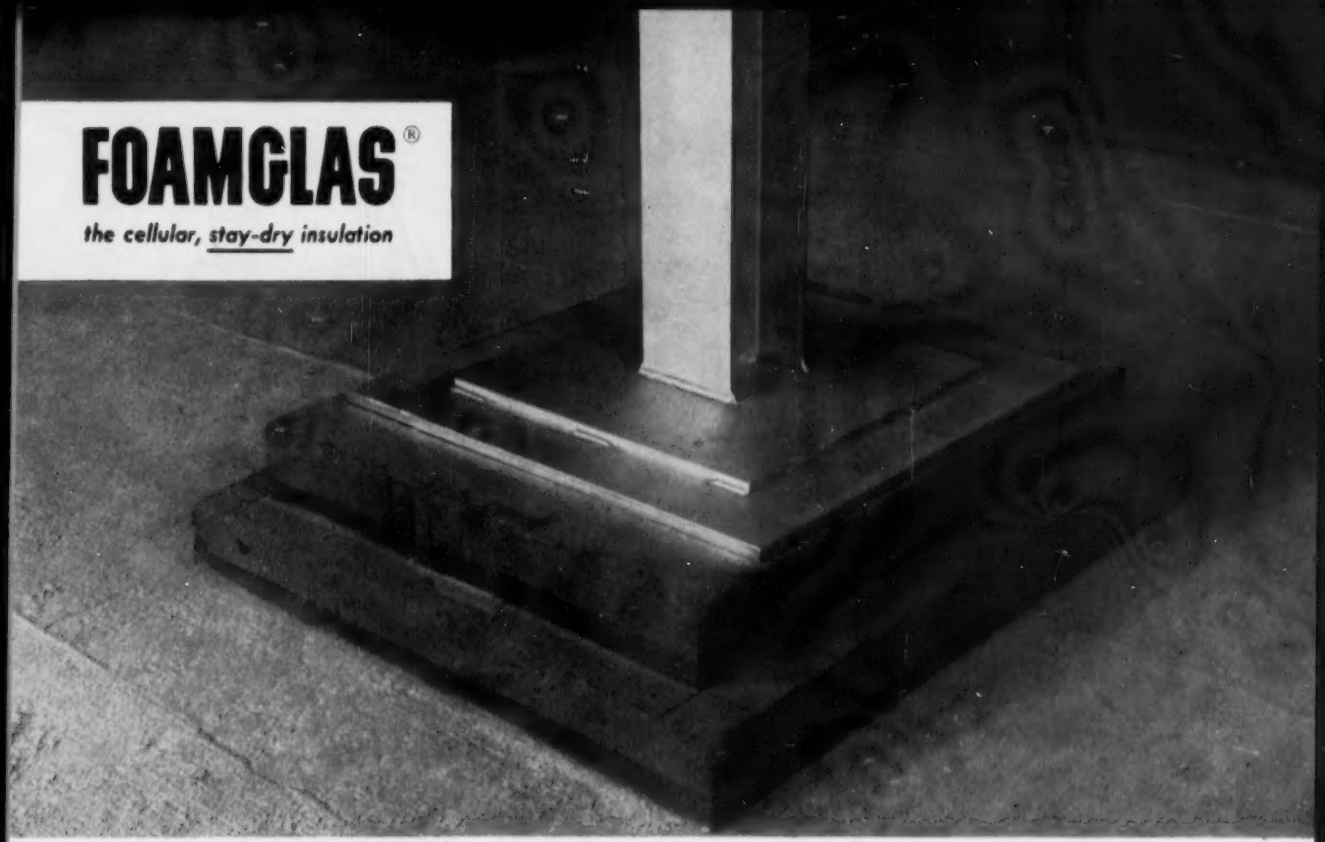
The fact is, stainless makes any equipment stronger, longer-lasting, easier to use. Check with your local Crucible representative for help in selecting the best stainless grade for your job. Or write *Crucible Steel Company of America, The Oliver Bldg., Mellon Sq., Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

FOAMGLAS®

the cellular, stay-dry insulation



President Carl Steimle of Southern Michigan Cold Storage says...

"The weight of our new warehouse actually rests on FOAMGLAS floor insulation"

"FOAMGLAS floor insulation actually supports much of the weight of our new refrigerated warehouse." That's the report from Carl Steimle, president of Southern Michigan Cold Storage Company, Sodus, Michigan. They picked strong, stay-dry FOAMGLAS to insulate not only the floor, but also the roof, ceilings and all walls of the new building, first stage in a $1½ million building program.

This unique all glass insulation has a compressive strength of over 7 tons per square foot. Mr. Steimle says, "That made it possible to prevent thermal 'short circuits' by putting insulation *between* all load bearing columns and other structural members. All columns bear directly on FOAMGLAS without reducing its insulating performance."

FOAMGLAS can't absorb the moisture that cuts efficiency of other insulations. "The result," concludes Mr. Steimle, "is *constant*, precise control of temperatures (from —35 to +35F°), and we don't have the headache of recurring insulation replacement."

These benefits will be *yours* when you insulate your buildings, piping or equipment with FOAMGLAS. Prove it to yourself with six simple tests which you can perform in your own office. Write today for a free sample and complete testing directions.

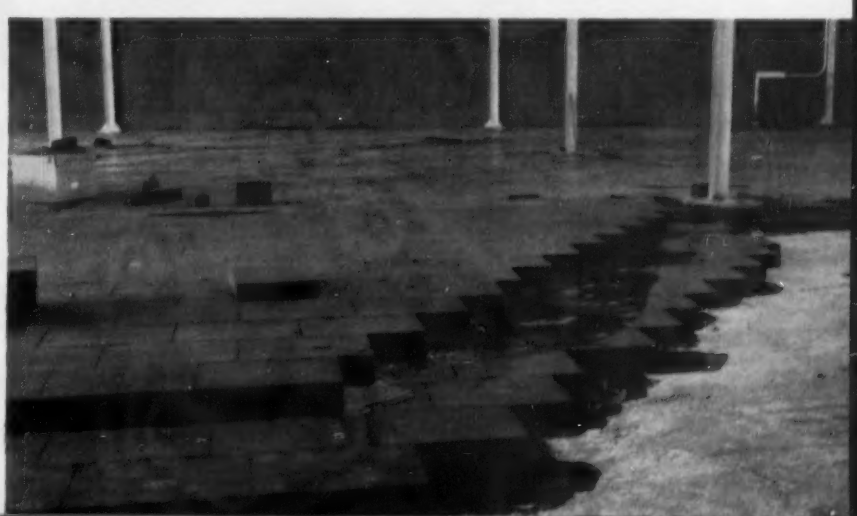
Pittsburgh Corning Corporation

Dept. O-66, One Gateway Center

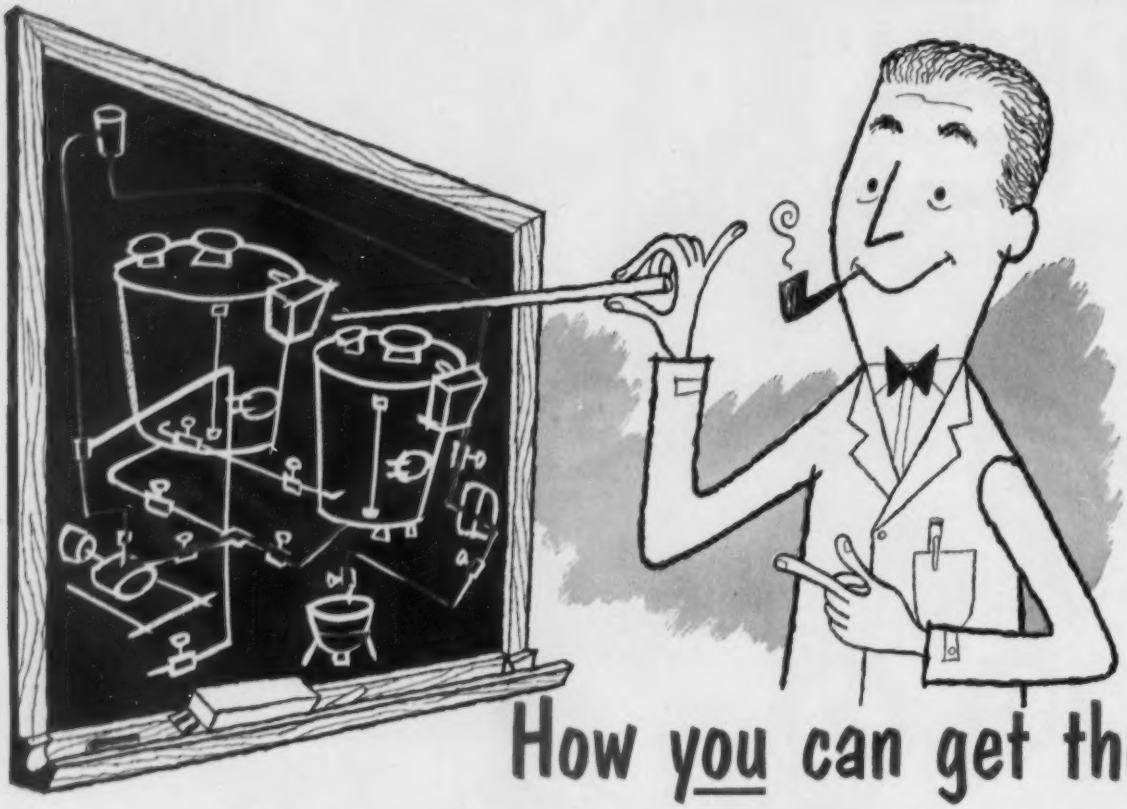
Pittsburgh 22, Pennsylvania

In Canada: 57 Bloor St. W., Toronto, Ontario

Two layers of 4" FOAMGLAS insulate the entire floor area. There are no thermal "short circuits" since all load bearing columns rest directly on this remarkably strong insulation (see close-up, above).



PC® Also manufacturers of PC Glass Blocks



How you can get the most out of a liquid sugar system

"These three hints," maintains your Flo-Sweet Engineer, "will help you get the most out of your liquid sugar system.

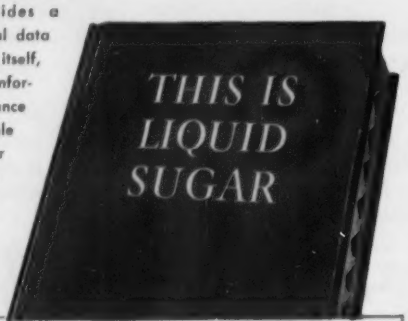
"First, make sure the system is designed by engineers who are experienced both in liquid sugar and in the technology of your food products.

"Second, have these engineers install the system.

"And third, use only top quality liquid sugar, blended accurately to your individual specifications.

"Here at Flo-Sweet we're in the habit of helping food manufacturers with all three of these important steps. In fact, that's our one and only business. If you aren't already enjoying the convenience . . . the sanitation . . . the cost-cutting and quality-improving advantages of a Flo-Sweet system — why not check with us today?"

"MUST" READING FOR EVERY SUGAR USER: This authoritative new manual contains over 200 pages of detailed information on the design, installation and operation of liquid sugar systems. It covers the use of liquid sugar in major food industries, provides a wealth of technical data on liquid sugar itself, and gives specific information on performance and costs. A valuable reference work for every food technologist's library. Price $5.00.



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YONKERS, NEW YORK

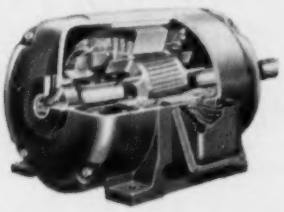
FLO-SWEET
FIRST IN LIQUID SUGAR

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY
FROM YONKERS—PITTSBURGH—TOLEDO—DETROIT

TWO WAYS...with Master Unibrakes

STOP-HOLD—Master Type M Magnetic Unibrake Motors. For quick, controlled stopping—especially when you want to hold the load. Spring-setting magnetic release brakes of the friction disc type combine with motor in a compact, integral unit. Sizes—⅛ to 150 H.P.

ROLLING STOP—Master Type D Dynamic Unibrake Motors. Braking is obtained with a unique, patented brake winding superimposed on the stator winding. Simple, compact, with no DC current required, the brake has no moving parts. There is nothing to wear or adjust—braking torque repeats consistently. Particularly recommended for automatic applications which do not require static holding. Sizes up to 30 H.P.



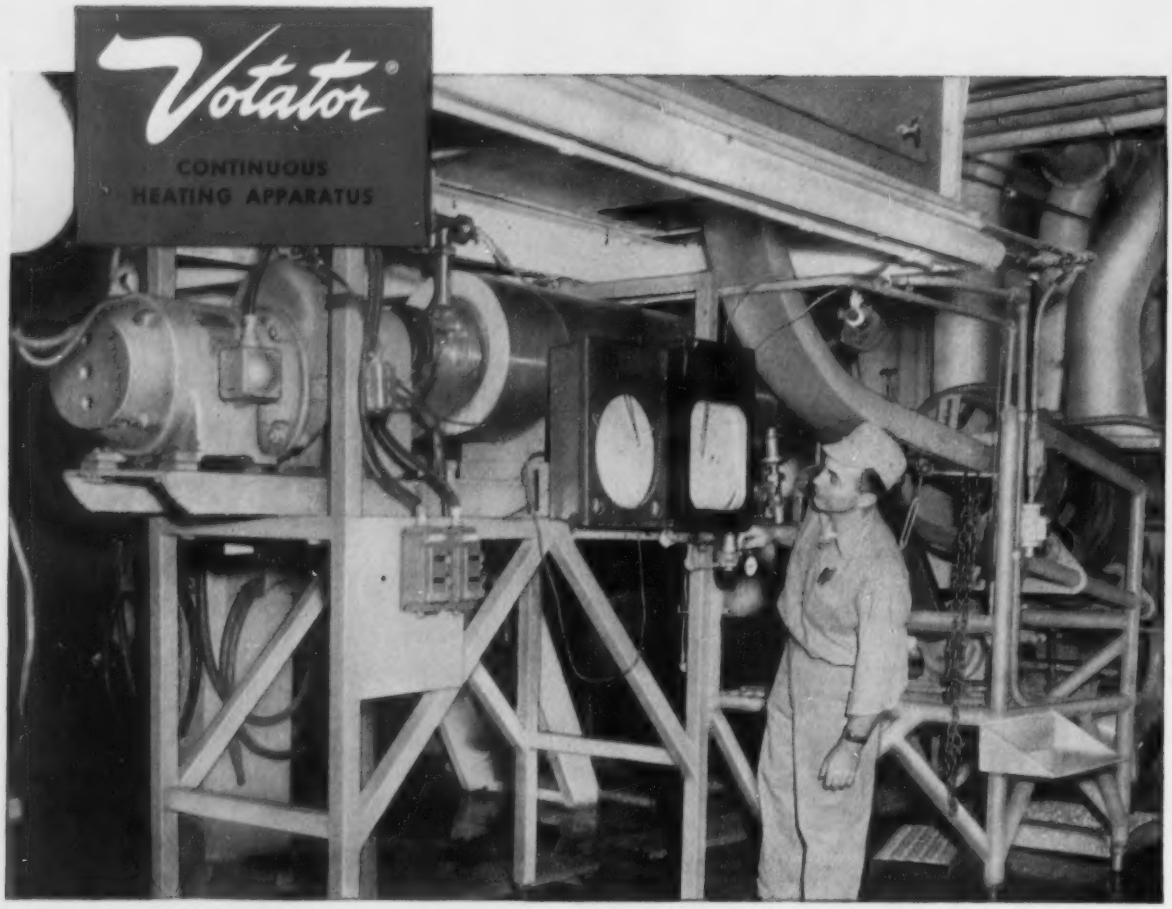
MASTER GEARMOTORS and variable speed drives can be supplied with integrated Unibrakes too. See Master for the perfect power drive for you.

Type M Unibrake

MASTER

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

UNIBRAKE MOTORS



Maintains peak flavor and quality of syrup at Kellogg

● This installation of VOTATOR* Continuous Processing Apparatus heats syrup at Kellogg Company, Battle Creek, Michigan. This is one of two units, operating 22 hours per day, 6 days per week.

This continuous processing in an enclosed system assures precise control of temperature, flavor and consistency for a uniform top-quality product. High-speed automatic operation minimizes labor and handling requirements, saves floor space, improves plant appearance.

Investigate VOTATOR Continuous Processing Apparatus for *your* products.

*VOTATOR—Trade-Mark Reg. U.S. Pat. Off.

IMPROVE QUALITY CONTROL WITH VOTATOR PROCESSING APPARATUS FOR

Cooling	Crystallizing
Slush Freezing	Aerating
Cooking	Mixing
Enzyme Inactivation	Sterilizing
Chilling	Plasticizing
Pasteurizing	Whipping

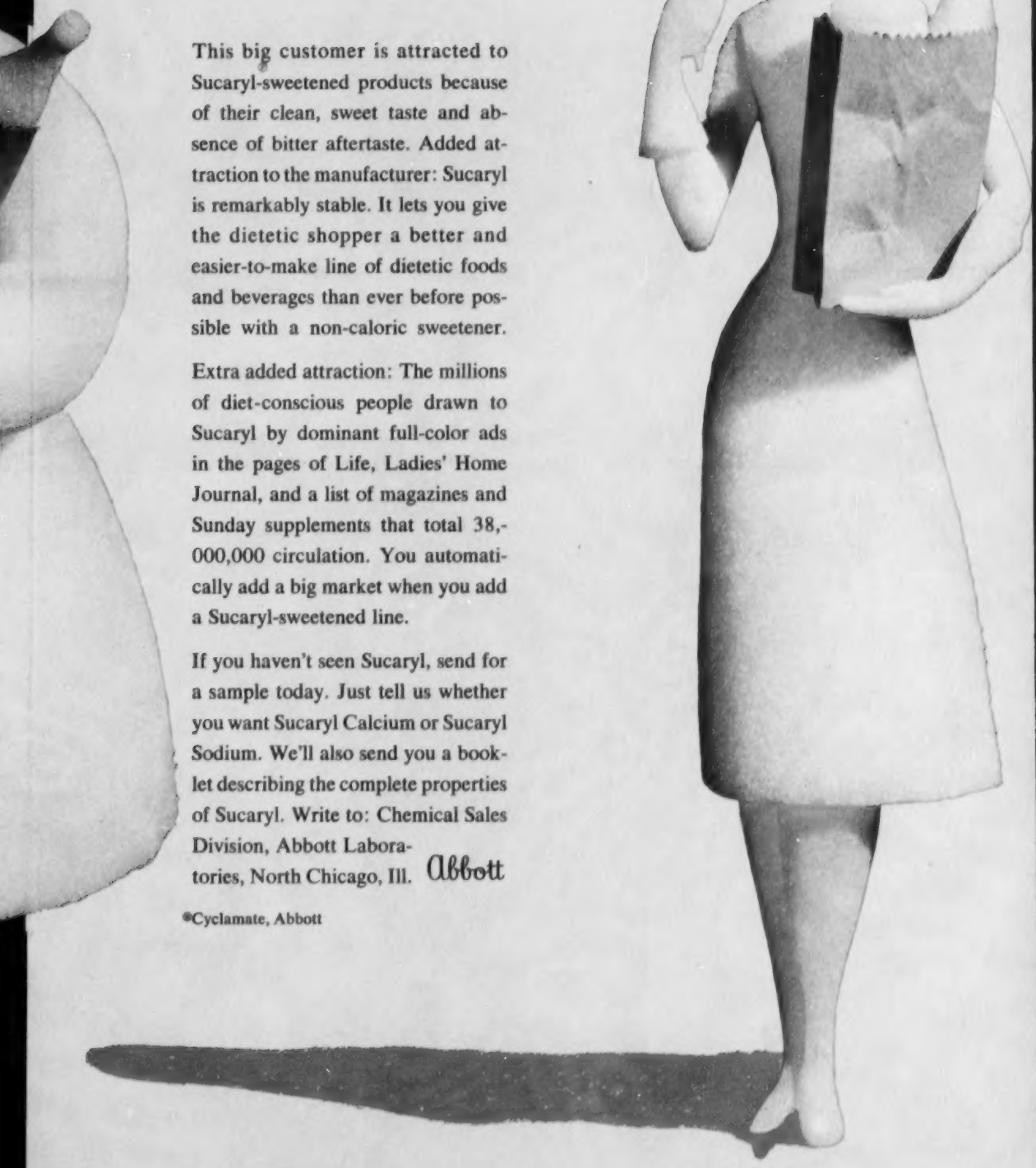
the GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

VOTATOR DIVISION • LOUISVILLE 1, KENTUCKY

District Offices: New York, Atlanta, Chicago, San Francisco

COULD YOU USE ANOTHER CUSTOMER?



This big customer is attracted to Sucaryl-sweetened products because of their clean, sweet taste and absence of bitter aftertaste. Added attraction to the manufacturer: Sucaryl is remarkably stable. It lets you give the dietetic shopper a better and easier-to-make line of dietetic foods and beverages than ever before possible with a non-caloric sweetener.

Extra added attraction: The millions of diet-conscious people drawn to Sucaryl by dominant full-color ads in the pages of Life, Ladies' Home Journal, and a list of magazines and Sunday supplements that total 38,-000,000 circulation. You automatically add a big market when you add a Sucaryl-sweetened line.

If you haven't seen Sucaryl, send for a sample today. Just tell us whether you want Sucaryl Calcium or Sucaryl Sodium. We'll also send you a booklet describing the complete properties of Sucaryl. Write to: Chemical Sales Division, Abbott Laboratories, North Chicago, Ill. Abbott

*Cyclamate, Abbott

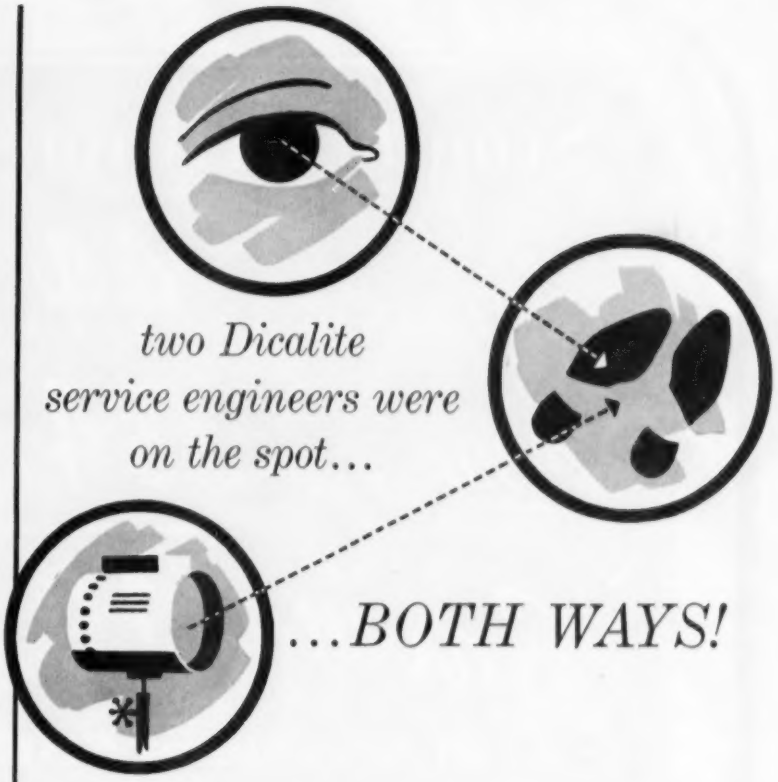
YOU ADD A
BIG
CUSTOMER
WHEN YOU ADD A
Sucaryl-SWEETENED LINE

FILTRATION ENGINEERING
—SCIENCE OR ART?

The life of a Dicalite filtration engineer is complicated. He spends much of his time running tests so that he will be able to recommend to a plant or laboratory the optimum grade and dosage of filteraid to attain satisfactory clarity in their particular process liquor. Yet hardly ever can the process engineer of such a plant define the degree of clarity desired in terms of properties which can be precisely measured in a laboratory. Further, the particulates removed by diatomaceous filteraids such as Dicalite are usually of a complex nature, complicated chemically, and troublesome because, as a general rule, their physical characteristics and particle size distribution are unknown. Consequently, when the filtration engineer begins his tests, he is working on the difficult problem of selecting the optimum filteraid without knowing exactly what he is trying to remove, or what precise degree of clarity is required. This explains why filtration engineering is commonly called an art. No mathematical equations for the prediction of clarity exist, despite many years of filteraid research—their formulation, in all probability, must await the development of improved tyndallometers and of stable clarity standards transferable from one laboratory to another. Filtration rates are another matter—Dicalite technicians have well established mathematical relationships for their prediction.

Actually, filtration engineering is an empirical science. Only by actual filtration tests can the selection be made of the proper grade of filteraid and the optimum dosage to obtain maximum throughput consistent with the desired clarity. Experience is an important factor in these tests, since familiarity with thousands of varied filtration systems helps tremendously in charting the most direct course through the many ramifications and possible procedures. Such experience is possessed in high degree by Dicalite service engineers and laboratory staff, among whom are nationally-recognized authorities on filtration. This is probably the reason why, each month, we perform scores of such series of tests for processors and filter manufacturers, either in their own plants or in the Dicalite laboratory. These tests, made without charge, are an important part of Dicalite service, aiding filteraid users to a solution of their problems and, at the same time, contributing to the steady advance in filtration technology.

Paul W. Leppla, *Technical Director*



This problem was a little different from those usually met with by Dicalite's technical service men. A large oil company, working on a new oil additive, had asked if our service engineers could aid in improving an unsatisfactory filtration. So far, an everyday situation. But when the two technical men arrived at the refinery, they found that the importance of the new product had drawn observers from all parts of the company and even from other firms, all deeply interested in the results. It was almost like working in a spotlight.

However, our service engineers produced the answer. They made Dicalite bomb filter tests on the spot, balanced the factors of clarity, throughput and costs. They were then able to recommended a Dicalite filteraid which, in the oil company's own words, "gives us higher clarity and better economics."

While not routine, this is typical of the work of Dicalite's technical service men. They will either work with you in your plant or enlist the services of the Dicalite laboratory to help solve the problem. One way or another, Dicalite answers, each month, scores of such problems—and will be delighted to help you with yours. Just write us.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION
612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA

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Simple Arithmetic...
Type 302, Sheet Base Price 44.50 cents per lb.
Type 430, Sheet Base Price -34.50 cents per lb.
Saving 10.00 cents per lb.
in Stainless SHEET Costs!

Now You Can SAVE $200 Per Ton!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10 cents per pound difference in base price. Some of our customers are already saving more than $200 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

6-W WOODLAND AVENUE, WASHINGTON, PA.

Here's How

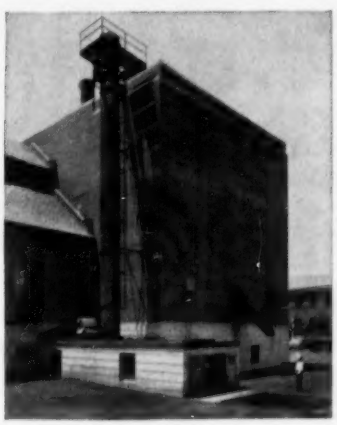
you can lower the cost of elevating

LINK-BELT will recommend the right bucket elevator from 13 types in 4 basic designs

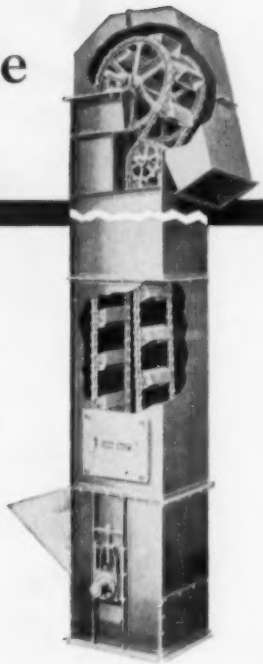
YES, not only does Link-Belt make bucket elevators for all types of material — there is specialization right down to spacing of buckets . . . the types of take-ups and hoods for utmost effectiveness. In addition, Link-Belt offers a wide range of buckets for further assurance of maximum efficiency in handling your materials.

Installation, maintenance and operating costs are low with Link-Belt Bucket Elevators. Rigid, jig-built casings are self-supporting requiring only occasional lateral tie-ins depending on height. You have quick access to both head and boot for periodic inspections. Simple screw or gravity take-ups maintain chain or belt tension always.

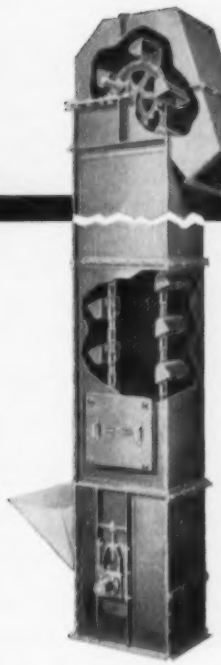
To be sure of a bucket elevator system tailored correctly for your needs, include Link-Belt in the designing of your next plant. Get in touch with a materials handling expert through your nearest Link-Belt office.



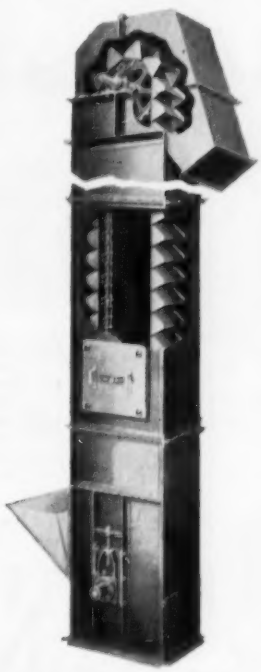
Link-Belt 75-ft. high bucket elevator lifts material from truck dump hopper to storage bin via screw conveyor. Casings need only occasional tie-ins depending on height.



Positive discharge for light, fluffy and fragile materials or materials that have a tendency to stick to the buckets.



Centrifugal discharge for free-flowing, fine or loose materials with small to medium lumps.



Continuous discharge for range of materials — light to heavy, small to large, abrasive lumps.

Internal discharge for gentle handling of small articles such as pellets, seeds, castings.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,786

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Nicholson *steam trap* capacity *gives you...*

faster, more effective condensate removal

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson capacity is greater than that of any other trap of the same size. And, greater capacity—right across the board—means the Nicholson trap discharges condensate and air from food process steam lines and equipment *faster*, more *effectively*.

- **powerful valve action—big husky bellows.**
- **positive shut-off—finely ground valve and seat.**
- **high capacity—effective use of large orifice.**
- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

ONLY GOOD FLAVORS can be relied upon to produce tastier, more palate-tempting confections. And the most competent production men in the industry are agreed that no matter what may be a manufacturer's advantages in candy making experience and facilities, his finished goods can be no better than the materials used in their manufacture. Remember: *Your product is* ONLY *as good as its* FLAVOR!

For helpful information on the flavoring of CONFECTIONS or other food or beverage products, write our Flavor Division, Dept. FE.

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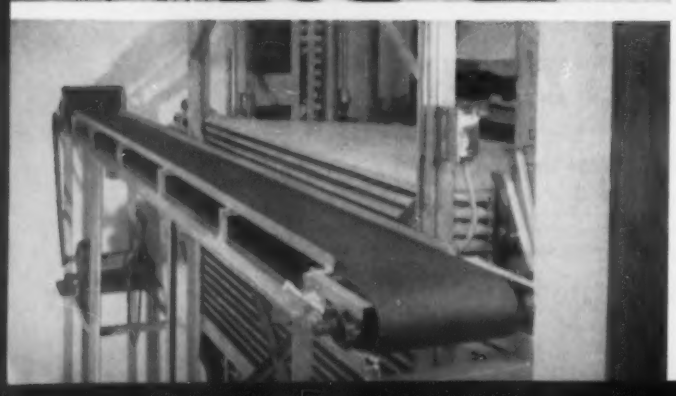
For more data, circle this page number on card at front →

THE BIG ADVANCE IN FOOD:



YORK CONTINUOUS PACKAGE FREEZER (left) automatically loads and unloads rectangular packages in volume. A single operator controls the entire freezing process. Automatic loader pushes each row of packages onto a freezing plate, where product begins freezing instantly on contact (upper left). Both top and bottom surfaces of packages are in intimate contact with plate and freezing is uninterrupted by loading of additional product. When filled, machine ejects row of frozen product for each new row of product loaded (lower left).

YORK-UNION CONTINUOUS FOOD FREEZER (below) handles varied products at high speeds, automatically. Amazingly versatile, this York-Union Continuous Food Freezer can freeze thousands of food packages an hour. A typical unit 60′ long, 14′ wide and 11′ high could freeze each of these quantities in an hour: 3720 half gallons of ice cream; 3560 loaves of bread; 2390 whole 2¼ pound chickens. A uniform temperature of −30° F. or lower can be maintained.

CONTINUOUS FREEZING BY YORK

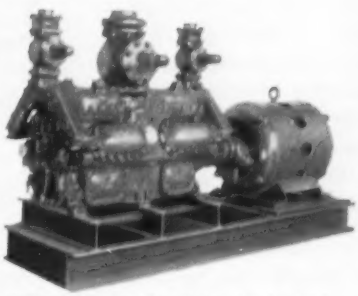
Two new versatile York freezing systems are completely automatic, make possible important economies in frozen food handling.

Automatic, high speed *continuous* food freezers are now a reality, thanks to York leadership in refrigerating equipment.

This is exciting news, not only for food processors, but for the housewife who buys food for her family. It can mean frozen foods in greater variety, at greater savings. Formerly, fresh foods had to be stacked on trucks by hand, pushed by hand into the freezer, and unloaded by hand. But York's new automated procedures will speed and simplify handling.

York designed one of these new freezers especially for large, bulky foods or odd-shaped packages. The other is for small, rectangular packages of uniform size, and can adapt itself to packages of different sizes as required by various runs.

For more information on these new freezers call your nearest York district office. The telephone number is listed in your Classified Directory under "Refrigeration Equipment".



HEART of any York freezing system is a York compressor. Above is a 3¾"x3" VW, one of many different types of York compressors.

York refrigeration air conditioning

the quality name in freezing

HEADQUARTERS FOR
MECHANICAL COOLING SINCE 1885

YORK
CORPORATION

WHY SHOULD THE VITAMIN C CONTENT OF FRUIT AND VEGETABLE JUICES BE STANDARDIZED?

Because nutrition reports disclose that—

- **Vitamin C deficiencies exist throughout the country***
- **Scurvy has not disappeared from the United States***

Proof of deficiencies among adults and children. You should know these facts!* Diet surveys from Maine and Vermont, New York, Illinois, New Mexico, Oregon, West Virginia, and Texas show a definite pattern of inadequate vitamin C intake. These studies covered grade school and high school children, college men and women.

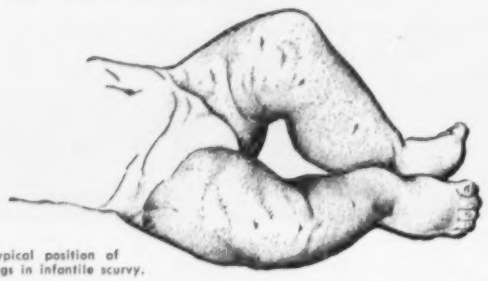
Spongy, swollen gums symptomatic of scurvy.

From these studies* of dietary habits and physical conditions there is considerable proof that many of the children and adults covered by survey have actual, physical symptoms of vitamin C deficiency.

Infantile scurvy. Scurvy* occurs, even today, among infants who are artificially fed. Fortunately the disease may be cured by the administration of vitamin C. How much more sensible it is to prevent it by supplying these bottle-fed infants with the daily allowance of 30 milligrams of vitamin C as recommended by the Food and Nutrition Board of the National Research Council for children under one year of age.

Symptoms of infantile scurvy are fretfulness and fear of being touched.

These bottle-fed infants, unless receiving a pediatric prescription containing vitamin C, are largely dependent on supplemental ascorbic acid which they receive from fruit or vegetable juices. Unless fortified with vitamin C many of the processed juices may not supply these babies with adequate quantities of this essential element.



Typical position of legs in infantile scurvy.

What can be done? Because of the increasing evidence that American diets are deficient in vitamin C, leading nutrition experts believe that processed fruit and vegetable juices, on which the public is so reliant for its supply of this necessary vitamin, should contain the "Vital Ingredient."

The Vital Ingredient of any processed fruit or vegetable juice is a *dependable* and *adequate* supply of vitamin C. You can give your juice this ingredient by *standardizing its vitamin C content*. The processing is simple and the new low cost of ascorbic acid makes juice standardization more attractive than ever.

With ascorbic acid available *by the tons* at extremely modest cost fruit and vegetable juices can have a standardized vitamin C content for the better protection of the nation's health and well-being.

*Statements are based on documented reports. References on request.

Illustrations after photographs in The Vitamins in Medicine by Bicknell and Prescott, Third Edition, published by Grune & Stratton, Inc., New York.

ROCHE Pure, crystalline VITAMIN C
(Ascorbic acid, U. S. P.)

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.

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You're Needed on Top, Mr. Technologist

But—Can You Bring Extra Abilities That Management Requires?

IVAN C. MILLER
Associate Editor, "Food Engineering"

TODAY'S INDUSTRIAL accomplishments—mass production, continuous processing, automation, and the resulting high spirals in volume output—are in large measure the contribution of the scientist and engineer. ▶**Here, the food industry, though not heading the parade, does march near the front.**

In truth, America's whole industrial operation has been revised. For along with those improvements, the technically trained specialists have brought hitherto unforeseeable (and so unplanned) changes in management structures, in management methods—and in their own status as well.

Particularly demanded by the scientific changes is some degree of technical understanding throughout virtually every segment of management.

These initially posed questions: Shall such technical aid to management merely be supplied by technical personnel on the staff? Or shall the technically trained actually take over specific large portions of management? ▶**The trend now appears to be the latter—challenging many of our specialists to further study and preparation.**

It was not always thus. Not many decades ago the technical man was considered only a "craftsman." So at that time his surest, and almost only, road to the top was via "business and sales."

First-Cousin Comparison

In the chemical industry, first cousin of our own industry, management by the technically trained is firmly entrenched and constantly growing.

A recent survey by the Manufacturing Chemists Assn. indicates that more than 50% of the chemical industry's top executives are technically trained, with 15% of them being chemical engineers. As for the total roster of men educated as chemical engineers, 30% now fill management posts throughout the full range of industries.

The fact is that technical men found prime niches in the chemical industry and there proved their worth long before their values were recognized by the food industry.

As one result, the chemical industry, with one-quarter the number of plants and half the number of employees in the food industry, has four times as many engineers and four times as many chemists.

Although scientists and engineers were well established in most fields before our industry woke up to their value, the importance of this group to our industry, especially as management timber, has nevertheless now been proved.

Of the engineers now in the food field, 13% fill management posts, while 15.3% of the chemists employed in the food field enjoy executive rank.

What lies ahead for our own technical men may be forecast, in a measure, from the position in which they now stand. And here, let us consider some fairly recent figures of the Bureau of Labor Statistics:

In 1951, only 7.8% of our industry's trained chemists were engaged in industrial production endeavors. However, fully 33.5% of the chemical engineers in food plants were filling production jobs.

Here are more facts on our field: Chemists in research and development, 39%; chemical engineers,

Though only yesterday a "kitchen operation," the food industry today has so far progressed that mass production is now the order . . . synthetics, electronics, and automation are coming in . . . and striking commercial procedures like irradiation may be only around the corner.

But reaping of maximum returns on the new and complex techniques will depend, first, on how well company managements understand them and, second, on whether they are "top-echeloned" to apply them.

This, Mr. Technologist, is where you are needed—provided you can acquire, and are ready to appreciate, the vital managerial requisites cited in this article.

34.2% . . . Analytical functions, chemists, 32.6%; but chemical engineers, only 8.4%.

Enlightening also is the fact that more than twice as many chemists were in technical sales and services as were engineers.

▶ That attainment of food-plant management positions by 13% of our engineers and better than 15% of our chemists is well above the performance of most industries. However, our need for many more—in a variety of posts—is very great.

Among the opportunities are executive assignments on the production lines, in sales, in comptrolling, and in purchasing.

Values to Management

The technical man can bring inestimable values to management.

Due to his academic training, he thinks logically and methodically. He knows how to accumulate facts, sift out chaff, store data of value, analyze situations, and arrive at sound conclusions.

Usually, this factual-analytical approach to problems, acquired during his college years, remains with him throughout life.

▶ In specific management pursuits, however, many of the technical man's assets can become liabilities—if not governed by specialized executive knowledge and experience previously foreign (in most cases) to the technical man.

Reliability is another asset of the technical man. But this trait may be overly-founded in self-reliance and assurance relative to the infallibility of technical methods and procedures.

As a result, this man frequently finds it difficult to work with the other people in the organization—rationalizing that it's "unnecessary."

True, this being a "loner" may pay off in certain special niches. But not in management.

As stated by William B. Given, Jr. (in *Harvard Business Review*): "Though scientific-engineering training prepares a man to approach problems from all directions, the training also prepares him to do it on his own. As a result, there are probably more lone wolves among technical men than anywhere else in industry.

"Sometimes their intellectual capacities and their ambitions lead them into management, where they may continue to build fences around themselves and around the field of work on which they concentrate, to the elimination of outside interests. They usually resent any intrusion on their time and thinking."

Any one who progresses up the ladder of management must constantly assume more responsibilities. Chief among them are the contributions as a member of a team. Just as there is no place in management's ranks for the prima donna and the malcontents, there is equally no room for the "loner."

Many Decisions Can't Wait

The technical nature and complicated structure of today's industry profits by the researching of facts on which to make sound decisions.

▶ However, management must constantly make a multitude of its decisions with far fewer facts than would satisfy the technical man.

Even successful salesmen and merchandisers may go to extremes in making decisions based on little substance. Others may call them "snap judgments" and "hunches." But on the other extreme, technical men who have "escaped" to management too often postpone needed decisions much too long. The excuse is "an insufficiency of facts," but the common result is an insufficiency of decisions. The organization is kept waiting, with too little accomplished in the meantime.

So, if the technical man is to enrich management with his trained and logical thinking, and with his technical knowledge of the industry, he must learn to arrive at decisions rapidly.

He must compromise between the perfectly analyzed solution and getting things done *now*. For the pace of business and industry is ever accelerated.

Further Soul-Searching

Today, management that fears to experiment, or to venture, or to create, will surely die of dry rot. And this has no reference to plunging or gambling.

Though management likes to be guided by facts and figures, it must be able to leaven such data with imagination, experimentation, and creative development—along with its seasoning of risk and adventure born of vigorous ambition.

Inherently, the technical man is intolerant of his own errors and mistakes. Logically, therefore, he's equally impatient with others' failures. So having less experience in making mistakes and "living with them," the technical man is severely handicapped when functioning as management. Literally, he's too often unable to take a chance.

Can You Delegate Authority?

Delegation of authority to others is management's common job. Usually it's the non-professional men in management who more readily delegate such authority, and by that same token risk-taking.

It appears less difficult for sales and financial executives, than technical men in management, to permit men having less experience and ability to make decisions.

In contrast, the technical man keeps thinking, "It's safer if I do it myself. Then it's sure to be handled right."

The precision and accuracy that are taken for granted in technical require-

15 Most Frequently Taught Subjects And Percentage of Use

(From management-development survey by American Management Assn.)

Topics	Percent Teaching: Companies With Formalized Plans	Percent Teaching: All Companies (Both With and Without Plans)
1. Human Relations	67	47
2. Supervision	55	36
3. Gen. Economic Understanding	32	27
4. Personnel Administration	31	21
5. Labor Relations	29	21
6. General Management	25	17
7. Organization	18	13
8. Salesmanship	17	12
9. Oral Expression	19	12
10. Public & Comm. Rel.	19	11
11. Policy Formulation	13	11
12. Written Expression	9	7
13. Financial Management	9	7
14. Production Management	9	7
15. Office Management	10	7

4 Ways to Get Bosses for Tomorrow

Future leadership and management of food companies can be recruited in four ways:

1. Getting key men from other companies, usually with the incentive of boosting their incomes.

If pursued on a large scale, such "pirating"—to use the common term applied to it—can push up your costs to a prohibitive level.

Also, this procedure, though occasionally justified, provides inadequate incentive for filling second-line or supporting posts.

2. Scouting colleges for them, procuring students graduated as "professional executives."

Colleges are now providing training that prepares students to fill managerial posts. Some of this training is for specialized positions, such as in accounting and comptrolling. Other curricula is more across-the-board.

Those so instructed will no doubt prove assets to management groups in some of our business and industries. However, the processing industries—and particularly the food industry—requires as "executive equipment" an understanding of the science, engineering, and processes involved in food manufacturing.

So there comes this question: "Which training can most simply be imparted to the man 'on the job'—'technologies' or 'humanities.'? Of course, the growing need will be met in time by teaching both in conjunction in regular academic training.

3. Promoting the most likely men up through the ranks.

First, assign ambitious and promising workers as foremen, and later advance the best of them as fast and as far as they can go. Let them gain the required knowledge of processing, along with some engineering and science, as they progress by experience on the way up. Have their superiors give them a hand. And advise night study as may be needed.

For the sake of morale values throughout the company, this avenue to the top should always be kept open. Furthermore, for the best interests of the organization, those capable of the climb should get pertinent training from the company.

4. From the "open market."

Keep a sharp watch to hire those technically trained men specifically seeking to enter management's ranks and rise to the top.

As for the technical man, himself, he should grasp every opportunity for study and training in those managerial attributes he lacks (see accompanying discussion).

If he is company-aided, financially or otherwise, he is fortunate. If not, he must "go it alone."

Like all things worthwhile, management posts have their price.—The Editors.

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ments become "perfectionism" in management. There it frequently retards mobility and tends to cripple morale.

One of the most difficult of all the hurdles—and this one is met all along the rugged road the technical man must travel to a successful management career—is human relations. For those constant human-relations problems can't be *"sliderule solved."*

This fact is well verified by a study recently made by E. G. Uhl, vice-president, Glenn L. Martin Co.—indicating that organizations headed by engineers and scientists are likely to have more difficulty with industrial relations than other firms.

This brings us face to face with what is likely the basic barrier to the technical man seeking success in management—intangibles.

For some persons—the gifted, the fortunate—these "elusives" come naturally. However, in management spheres, the professional and technical men tend to underestimate the worth and importance of intangibles.

Granted, they may be ruled out without severe consequence in the specific precision work of lab, pilot plant, or drafting room. But in all associations with *people*—in production, in merchandising, in community and public relations—full cognizance must be taken of the vital role of intangibles.

Training Tips and Techniques

What subjects should you study? And where and how is the training best obtained?

Here, there can be no direct answers. Individuals differ in personality, aptitude, background, ambition, and ability. Also, the "plant scene" varies, likewise its locale. Facilities for training may be locally handy, or may be non-existent.

Studies have been instituted to learn how the time of top management is spent—thus to provide a basis for planning and implementing the most effective instruction. And two findings thus uncovered are pertinent.

First, most executives reported that half or more of their time was devoted to personnel relations, in some form or other.

Second, approximately 90% of the executive's time was in some way occupied by communications.

The recent surveys reported by American Management Assn. (in its series, *Management Education for Itself and Its Employees, Part II*) reveals training procedures of approximately 2,000 companies, both large and small.

And the training subject deemed most important—because it was included in more programs than any other subject—was human relations. For the other topics among the first 15, see table on opposite page.

▶To take a sharper look, most courses taught fall into one of these three groups:

1. Those concerned with relationships between people—personnel, industrial, supplier, and public and community relations.

2. Communications, oral or written—how to say what you mean and how to make yourself understood.

3. Fundamentals of business—policies and procedures.

In the past, matters relative to instructional techniques have been confusing. And they may continue to be so, in that, when some company's results are successful, the technology alone may be credited and copied rather than the vital subject material and the ability of the instructor.

Nevertheless, the preferences of the companies reporting may offer a reliable index to technique merits. Here they are (most-used listed first):

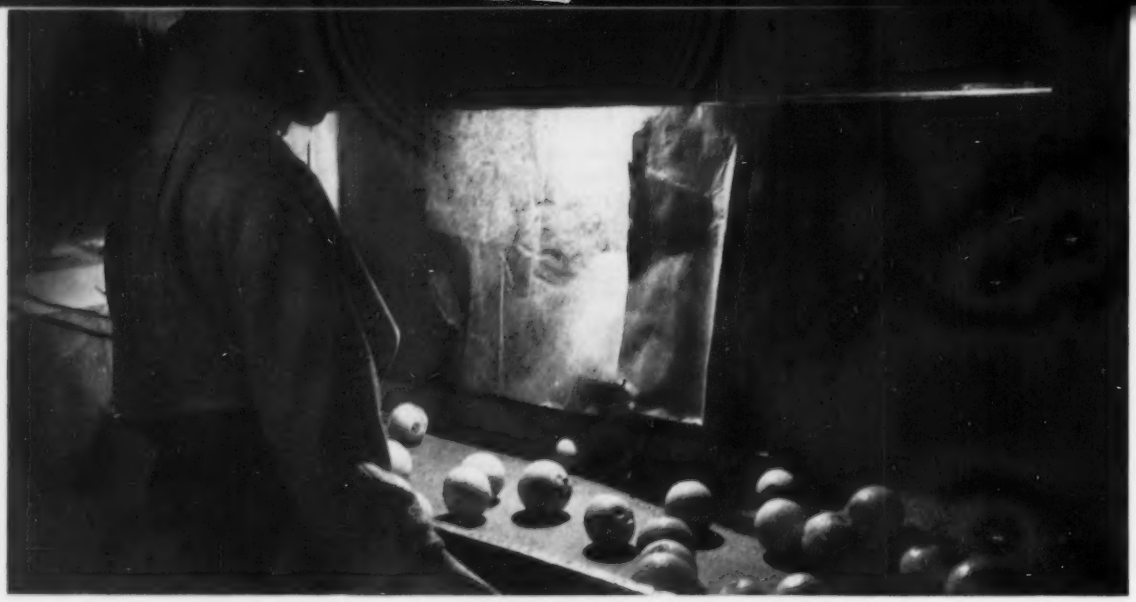
Job experience, coaching, understudy positions, individual counseling, conferences and technical meetings at company expense, job rotation, in-company training classes, memberships in professional and technical associations, special "trainee' positions, committee assignments, management courses in colleges and universities, other outside company courses, planned visits to other companies, AMA seminars, management courses, "multiple management" plans, and training by outside consultants.

A Look at the Methods

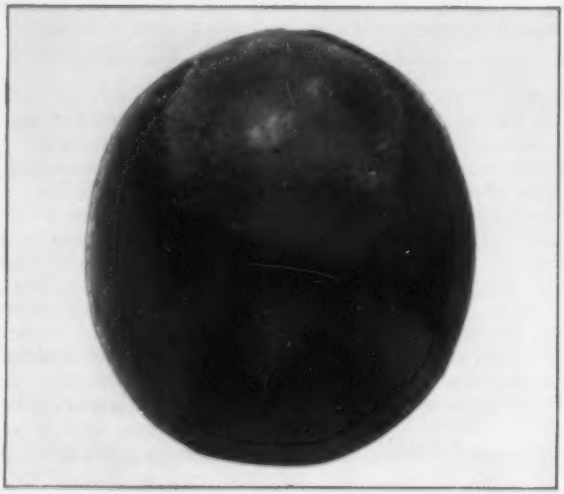
Different methods or presentations may have been employed by the surveyed companies at different management levels. However, for the overall consideration, here are the most frequently used methods of instruction in order of preference:

Group discussion or "conference,"

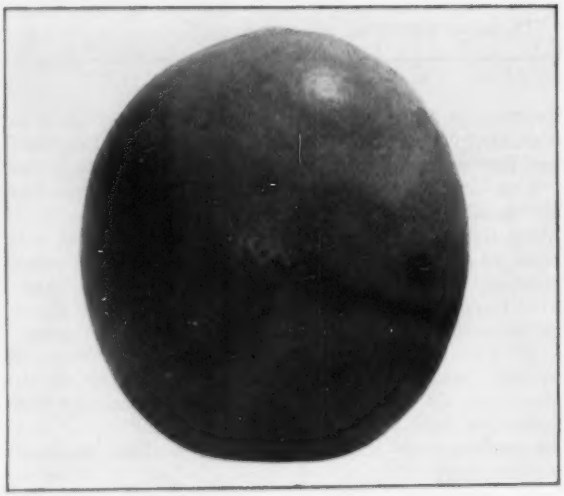
(Turn to page 162)



Beamed over citrus belt, black light speedily reveals . . .



. . . decayed area on this orange . . .



. . . not apparent in regular light

BLACK LIGHT: Super Sleuth

It quickly detects products on the verge of spoilage, stale ingredients, adulterations, infestations by rodents, improperly cleaned equipment, and leaks in lines . . . Test units available for specific uses.

TODAY, black light is illuminating many a food-processing sore spot. For some it had become a kind of sanitary engineer. For others it is regularly used to check the quality and age of ingredients–and with some remarkable results.

The term "black light" is used to designate long wave (3,660 angstrom units) ultra-violet radiation. Units emitting these rays are available in several types, each suitable for a specific application.

Black light analyses are especially effective for testing foods where sensitivity, rapidity, and reliability are demanded. In these analyses the samples or specimens are not damaged, handled, or effected in any manner. Also, black light is completely harmless to eyes and bodies of personnel.

A few of its many food plant applications are described below.

Sour Rot in Eggs

Eggs that look and smell normal can still be infected with pseudomonas organisms, which multiply rapidly, contaminating entire batches of

broken out eggs, or cake batters, mayonnaise, and other products made from them.

By installing special black light fixtures above egg-breaking tables, it is possible to completely eliminate this problem. Lights should be 2½-3 ft. above table tops, and 2-3 in. below level of workers eyes (see photo below).

The eggs are broken into regular "sniffing" cups so placed that the rays shine directly into them. Whites carrying pseudomonas organisms fluoresce a brilliant green and can be instantly detected and discarded. Actually, the lights show presence of the organisms long before they are apparent to even the most sensitive sniffer.

This type of inspection is seen as a "must" in the packaging of shell-less eggs (see FE Dec. '55, p. 164).

Washed eggs may also be detected by these lights due to fluorescence of traces of detergent remaining on them.

The information contained in this article was supplied by **John B. Panushka**, Vice-President, Ultra-Violet Products, Inc., San Gabriel, Calif., **P. W. Cooper**, President, Black Light Eastern Corp., Long Island City, N. Y., and **James Joseph**, Special FE Correspondent, Los Angeles.

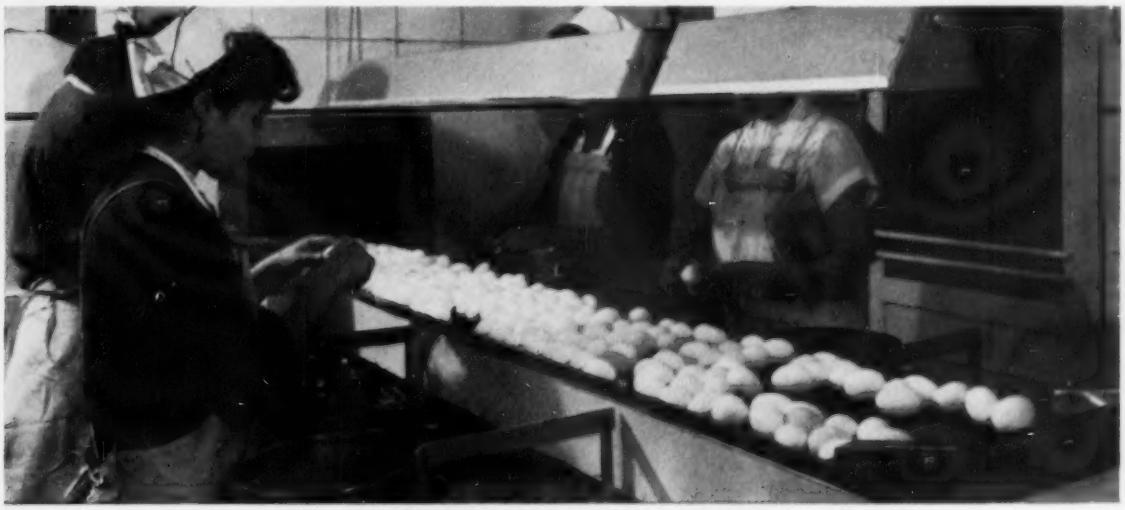
Spotting Milkstone, Bruises, Rot

Public health authorities and dairy plant sanitarians are placing more and more emphasis on deposits of milkstone on equipment, pipelines, and containers. For such deposits are potential breeding grounds for harmful bacteria.

They indicate inefficient cleaning techniques or carelessness on the part of clean-up personnel.

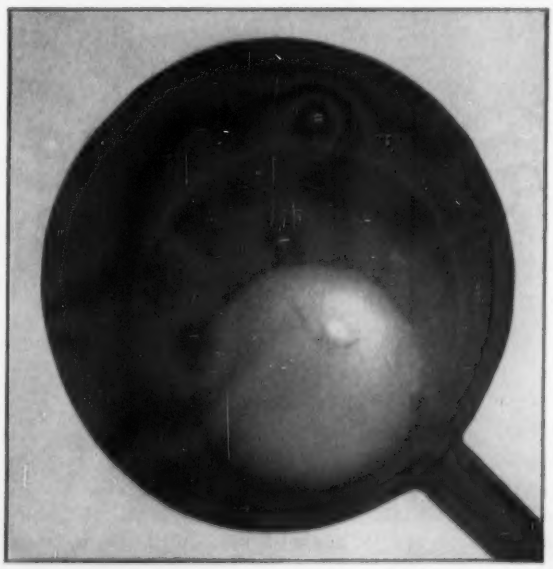
With the aid of high-power ultraviolet, minute traces of milkstone, not apparent to the naked eye, can easily be detected. Clean equipment has a dark blue-violet color under the light, while milkstone or other soil fluoresces yellowish to blue-white.

Bruise and rot spots on citrus fruits are easily revealed by black light, even though such flaws may pass regular visual inspection. Deteriorated areas fluoresce a brilliant violet that stands



At egg-breaking station, black light discloses . . .

. . . infected egg like this . . .



. . . when in common light it looks O.K.

out against the darker background of the healthy skin.

In the case of seafood, fresh shrimp fluoresces a purple-blue, which changes to white as spoilage develops.

Separation of shell from shrimp and crab meat is easy and far more accurate with black light. Shell particles fluoresce blue-white under the lights, enabling removal of additional amounts of exoskeleton as well as endoskeleton not normally visible.

Another seafood application is detection of parasites in fish fillets. With black light many more of these are detected than under regular illumination.

Many food processors are inspecting their lavatories with black light. Urine stains show up immediately, fluorescing blue to yellowish white, and a gray-hue reaction on the washbasins indicates grease.

Adulterations and Impurities

Ultra-violet light can be very effectively used for the detection of adulterations and impurities in food products.

In the case of cocoa, shell tissues appear buff-brown under black light, while the nibs show blue-violet shades.

Immediate detection of other berries and roots in coffee is possible. For example, chicory fluoresces yellow-white, and taraxacum root shows a blue color.

Another example is the use of these rays to distinguish between virgin and refined olive oils. The virgin oil reacts yellow, whereas that exposed to strong heating shows a bluish-green or violet color. Mineral oil fluoresces a brilliant blue, and so can easily be spotted when mixed in vegetable oils, which fluoresce yellow or green when obtained by expression and violet when by solvent extraction.

Good wheat and rye flours usually fluoresce blue, while barley and potato flours appear white and gray-brown, respectively. Talc, chalk, rodent excreta, hair, and similar contaminants appear dull violet against the flour's normally bright fluorescence.

Pink wheat treated with a mercuric compound to control seed-borne disease usually shows a bright orange, due to additives in the compound. These make detection of even minute amounts of such wheat simple.

Detection of rodent urine stains on cloth bags and similar containers is very simple. Dried urine stains usually fluoresce blue-white, although the color may vary somewhat depending on the natural color of the cloth. Check samples may be run with known types of contamination and stain.

For revealing rodents in a storage room, the floor should be inspected around larders and bins in the darkened room. And since rodents almost always urinate while in motion, their paths fluoresce in a characteristic "droplet" pattern. Dried urine fluoresces bluish- to yellow-white, while fresh urine appears bluish. In certain cases a fluorescent tracer powder may be desirable.

Stale Ingredients

The difference between fresh and stale foods can rarely be disclosed by simple physical or chemical means. But, under an ultra-violet light fresh products usually appear quite different from stale ones.

In the case of eggs, the fluorescence increases with age. Those 16 days old appear similar to a 0.25% gelatin solution, and after 120 days they resemble a 12.5% solution.

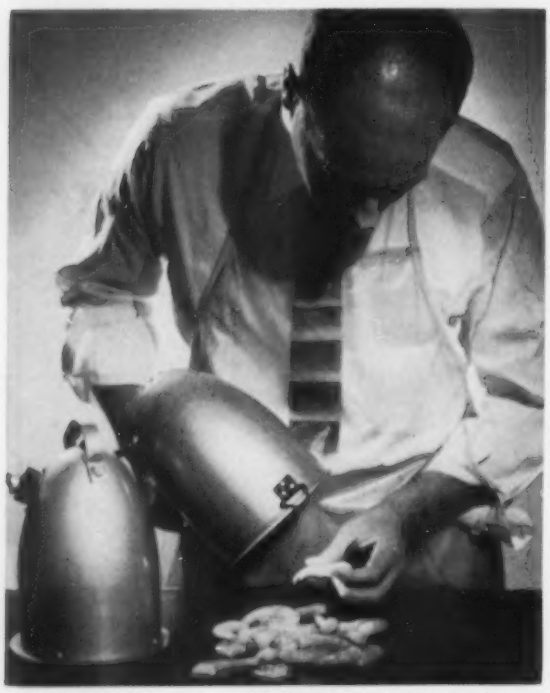
The reddish reaction of egg shells diminishes with time, gradually changing through a reddish-violet to a blue after 10 days. Fluorescence of frozen eggs appears more reddish than fresh ones.

Walnuts, hazelnuts, and almonds appear purple to lilac when fresh, changing to yellow or brown when aged.

Virgin olive oil changes from yel-

(*Turn to page 193*)

Portables Permit Close Check of Foods, Equipment



AGE of seafood is easily determined. Fresh shrimp, for example, appear purple-blue under ultra-violet. This color changes to white upon spoiling.

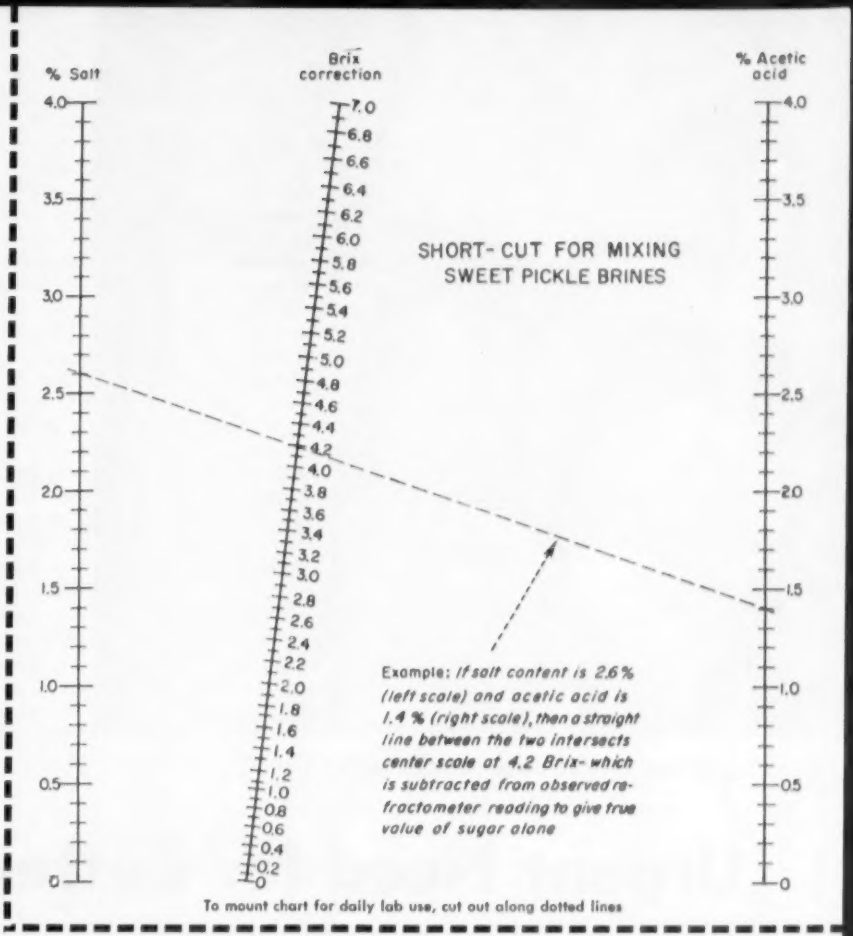
ORGANIC DEPOSITS on kettles and other units fluoresce differently from the metals, thus are easily detected. Milkstone, for example, looks yellow to bluish-white.

Handy Way To Get True Sugar %

Brix of sweet pickle brine is affected by acid and salt content. And just how much is quickly found on this easy-to-use chart — assuring fine-line formulations

C. HEREPEY-CSAKANYI and H. PIVNICK

Respectively, Food Technologist, Alphonse Raymond Ltd., Montreal, Canada, and Assistant Professor of Bacteriology, U. of Nebraska, Lincoln


% Salt
Brix correction
% Acetic acid
SHORT-CUT FOR MIXING SWEET PICKLE BRINES
Example: If salt content is 2.6% (left scale) and acetic acid is 1.4 % (right scale), then a straight line between the two intersects center scale at 4.2 Brix- which is subtracted from observed refractometer reading to give true value of sugar alone
To mount chart for daily lab use, cut out along dotted lines

Here is a new lab aid for the processor of sweet pickles—enabling fast and accurate determination of the true Brix value of his product.

This new "yardstick" is most valuable, because need has been shown for a definite sugar-acid ratio to prevent spoilage[1] and insure consumer acceptance[2].

▶ What is not generally known is that Brix readings of such pickles—ordinarily determined by the manufacturer with a hand refractometer—are greatly affected by both salt and acetic acid in the brines. And the neglect of this factor can lead to errors in sugar content of over 15%!

Specific investigation was undertaken to find out the exact extent of these errors, and an easy way for the processor to make the necessary corrections. Results show that variations in Brix readings can be speedily gaged by use of a simple chart (see nomograph).

And once salt and acid content are known, their corresponding Brix values are merely subtracted from the observed refractometer reading to give a true figure for sugar content.

Testing Methods

To arrive at this handy guide, the following analytical procedures were used: All Brix measurements were made with a hand refractometer (Zeiss Opton), calibrated to read percent-sugar w/w (with water).

Acetic acid and sodium chloride were determined, respectively, by titration with solutions of 0.1667N sodium hydroxide and 0.1711N silver nitrate[3]. Sucrose was analyzed by copper reduction, following inversion. And corrections were made for increased weight due to hydrolosis[4].

Solutions containing varying percentages of acetic acid and sodium chloride w/v (with vinegar) were prepared, and their exact content determined by titration. Brix readings were then taken with the hand refractometer.

As a check, commercially prepared sour pickle brine was also analyzed for acetic acid and sodium chloride content. Brix readings were made, then compared with those from the pure solutions.

Finally, sweet pickle brines were

(Turn to page 94)

New Data Check Closely With Observed Readings

Sample	Brine Analysis			Calculated Brix Readings			Observed Brix Reading (refractometer)	Difference**
	% Acetic Acid (With Vinegar)	% Salt (With Vinegar)	% Sucrose (With Water)	Acetic Acid	Salt	Total*		
a	2.3	2.9	30.5	1.2	3.9	35.6	35.6	0
b	1.9	2.6	33.5	1.0	3.5	38.0	38.8	+0.8
c	1.8	3.6	31.3	0.9	4.6	36.8	37.2	+0.4
d	1.9	3.8	30.5	1.0	4.8	36.3	35.7	−0.6
e	1.7	3.3	31.7	0.9	4.3	36.9	37.5	+0.6
f	1.8	3.3	32.1	0.9	4.3	37.3	38.0	+0.7

*Percent sucrose plus acetic acid plus salt. **Observed Brix reading minus calculated total. Calculated acid and salt Brixes are figured from nomograph.

Toppling warehouse stacks point up . . .

Do many shipping cartons fall short of basic strength needs? Here are salient facts that say 'Yes!' And expert tips on how you can "specify" them to avoid costly damage

Urgent Need for Better Cartoning

WILLIAM J. HOOVER

Assistant To the Director, Refrigeration Research Foundation, Colorado Springs, Colo.

WE KNOW that prime function of a shipping container is to protect its contents. Yet there are many cartons today that fail to meet even this very fundamental requirement.

From the warehousing standpoint, factors that make a package a good bet differ little from those desirable from a modern materials handling view. There are, however, some extra considerations when studying refrigerated storage of cartons.

Let's look at the pointers turned up by The Refrigeration Research Foundation (TRRF) and National Assn. of Refrigerated Warehouses (NARW) in four surveys conducted between 1940 and 1954:

By far the most important cartoning problem is lack of stacking strength in shipping cartons. This has become crucial, now that non-weight-supporting commodities are being packed in fiberboard.

Also, increased use of mechanical, palletized handling and higher piling heights necessitates development of stronger fiberboard containers. Cartons should now have enough strength to permit stacking to at least 16 ft.

What are the elements contributing to stacking strength and stack stability of containers? There are four: (1) Container size, (2) shape, (3) glues,

BAD VS. GOOD CARTONS. Too-large, square-shape cases (left) crush, can't be tied-in on pallets. Ideal load (right) has greater damage-resistance.

MULTIPLE CASE SIZES for a single product and container size makes handling difficult—palletizing impossible. Note unstandardized labeling, a shipper's bogy.

tapes, and adhesives, and (4) structural design.

Very important, too, is size. An economical package—for both hand and mechanized handling—contains 40-70 lb. of commodity. Cartons that are handled manually should be limited to 50 lb.

Boxes containing light material should be restricted to 4-cu. ft. volume, and cases containing heavy goods, 1-cu. ft. Small containers, not conforming to these dimensions, should be bundled—or, better, packed into a master case that does conform to the above measurements.

Grocery wholesalers, working with the U. S. Dept. of Commerce's Standards Div., have now agreed on two standard pallet sizes—40x32 in. for loads to 1 ton, 40x48 in. for heavier loads.

Horizontal dimensions of a good warehousable container should be designed to fit these standard sizes. And a dual purpose chart, developed by the Navy for 40x48-in. pallets, speeds selection of the best pallet patterns and case dimensions from hundreds of possible combinations.

But thought should be given to more than pallet layout. Dimensions that best fit refrigerated truck and railroad loading patterns are also vital, if transportation space is to be used efficiently.

Another point: The master package must fit the contents. Wrong carton sizes are causes of much damage. For if cartons are too small they bulge, causing piles to lean and topple. If too large, cases crush.

Here, allowances must be made for changes in product size during freezing, handling, and storing.

Failure to consider this factor is most obvious in boned-meat packaging. Almost universally, these boxes are filled to capacity—or beyond. Then as the meat expands during freezing, boxes balloon and defy piling.

Many people vividly recall a similar difficulty during World War II. Then, bulk frozen fruits were packaged in bulging ice cream cartons, which substituted for standard 30-lb. tins.

On the other hand, some bulk-packed products are settled during shipping and handling. This leaves containers grossly slack-filled. And so invites crushing.

Standardize for Efficiency

Another prime packaging factor, frequently violated, is standardization of carton sizes. A single packer has been known to use various-size cartons for the same product (see photo). It can be readily understood that such differing lots are difficult to hand stack—let alone palletize.

Now a word of caution about container shape: Choice of a square box should be avoided. It will not stack well or "tie-in" on a pallet. Rectangular forms are best. To illustrate, the shape of a brick is not accidental. Its design permits tying-in, which adds greatly to the strength of a wall.

Slick-finished fiberboard surfaces should likewise be avoided. They cause cartons to slide off leaning piles, and off pallet loads when a fork truck turns a corner. This produces a hazard to warehouse personnel, as well as unnecessary damage.

Many warehousemen now use a special glue to stabilize palletized stacks. This product is brittle and breaks easily when a case is lifted, but it resists side slippage.

Other warehousemen use sheets of paper or corrugated-fiberboard stock between box layers for stability. The oldest method, still widely used, is tying pallet loads together with rope.

But all these tricks are merely ways to compensate for original poor design of the packages. Such devices cost time and money.

Product quality can likewise be affected by carton design—as in rapid cooling of produce and quick freezing of certain foods such as poultry.

Shipping containers in which these products are packed must have an adequate number of holes, properly placed to give good ventilation and fast cooling. Their improper placement will markedly reduce marketing life and value of the foods.

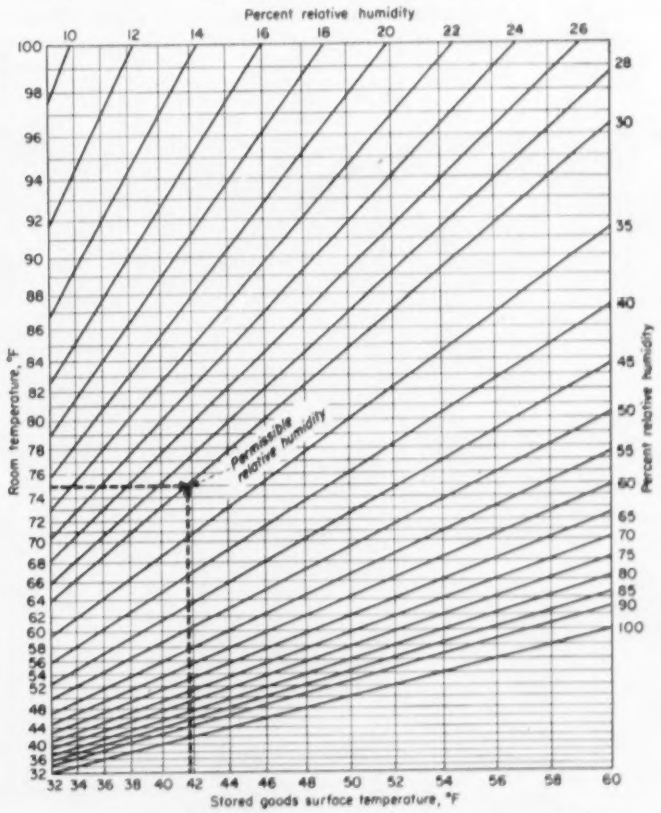
Carton Identification

Case marking is another area in great need of standardization. Today, labels are radically different in size, positioned differently on the packages, and often contain only scanty information.

The National Assn. of Wholesale Grocers of America has studied this situation and come up with the following pointers for manufacturers:

1. Mark cases on all four sides so

Chart 1 – How to Gage "Sweat-Point" of Refrigerated Goods



Intersection of goods surface temperature line with room temperature line gives relative humidity permissible in room without surface condensation.

Example: If stored goods are to be moved from a room at 41.5 °F to a room at 75°F, the relative humidity in the 75°F room must not be over 30 percent in order to avoid condensation. As surfaces rise in temperature, a higher relative humidity can be tolerated.

By Carl F. Kayan, Columbia U., N.Y.C. for The Refrigeration Research Foundation (Copyrighted)

vital identification cannot be mistaken, no matter how cases are placed in storage.

2. Print information in easy-to-read bold type, not less than 1 in. high. Do not use stencils that may rub off. Or paste on labels that may scuff off.

3. Use different colors to distinguish various goods in a broad product line.

4. Mark both top and bottom of cases where multiple products are shipped. This speeds selection when unloading cars.

5. Include essential identification on every case: (A) Quantity contained, (B) brand name, (C) package or can size, and (D) product name and variety. Desirable additional information is: (E) manufacturer's address, and (F) code numbers.

Vital—Carton Design

Final factor in case strength is structural design of the carton.

In corrugated cartons such features are inner partitions, extra wall thicknesses, corner posts, and corrugations vertical to the stacking plane—adding markedly to container strength.

In contrast, poor adhesion "leaning" corrugation, off-dimensions that don't "square", poor manufacturer's joints, and improper depth of slots all lower quality of shippers.

As a bad example, glues that become brittle and lose their sealing properties at below-zero temperatures are still being used on many frozen-food master containers. Yet adhesives are available that function properly even under these adverse conditions.

Also, excessive printing pressures result in crushed corrugations, which in turn lowers stacking strength.

Yet, unless linerboard and corrugated material have adequate inherent strength, even the presence of all these other desirable traits will not produce a good carton.

To cover this latter factor, Uniform & Consolidated Freight Classification Rules have been passed by the Official Western & Southern Classification Committees of the American Rail Road Assn. These groups are under the authority of the ICC. Committees' actions are reviewed by the Commission and have the effect of law.[1]

Rule 41, Section 3, of these standards sets forth basic minimum requirements for fiberboard containers, together with a method for making a bursting test (Mullen).

Granted, use of this test as a criteria of fiberboard strength probably meets the transportation needs for damage prevention during shipping. And it may have met needs of users years ago when almost everything packed was rigid and supported weight itself (such as canned goods).

But today, Mullen-test results do not correlate well with stacking strength of fiberboard boxes. Additional strength tests, such as the top-and-bottom compression test, should be used to arrive at basic container design. Also, flat crush and puncture tests are better indicators than the Mullen, and should be in "specs".

However, the Mullen test does serve a useful purpose in testing actual materials used in corrugated boxes. If materials are good, and if box is then well fabricated, a good container will result.

Further, it is contended that visual inspection of a completed container gives manufacturer and user alike a good idea as to fabrication quality. In fact, a practical quality control program has been devised whereby a processor can check his own containers against the "specs"—using only the Mullen test and visual inspection.

Wet strength of fiberboard is a vital consideration to refrigerating warehousemen. For they are faced with the problem of dew-point moisture condensation.

This unfortunate phenomenon occurs when containers are moved from lower to higher temperatures. Sweating results, soaking the master carton and reducing its strength.

Furthermore, cans packed in these cases rust. Labels and inner packages become waterspotted. And inks run.

At present, protection is sought in a lengthy and costly tempering process. This means warehousemen must provide special tempering rooms if less than roomsized lots are to be removed from refrigerated storage.

Here, product temperature is gradually raised to the point where there is no danger of condensation when goods are placed under normal conditions of temperature and relative humidity (see Chart 1).

Work has been done on this problem and is continuing under Dr. J. G. Woodroof, U. of Georgia, and Prof. C. F. Kayan, Columbia U. They are being aided by TRRF.

The task is made more difficult,

STACKING IRONS speed up lift truck handling and reduce case damage at Security Warehouse & Cold Storage Co., San Jose, Calif.

however, by differences in insulative properties and air-tightness of cases—and by variations in heat transfer coefficients of the products.

Stacking Affects Strength

With any given compression strength, stack stability of a case is influenced by five conditions: (1) The handling that the container receives, (2) actual dead load on the box, (3) storage temperature and relative humidity, (4) length of storage period, and (5) stacking or pallet pattern used.

Naturally, any handling that actually damages the container lowers compression strength. But not so well appreciated is the fact that every handling reduces this value.

Thus, the total number of times a carton will be moved, from plant through marketing life, should be considered when determining original design strength.

Regarding effect of dead load and duration of load necessary to cause box failure, researchers[8] state: "Behavior of boxes, subjected to various dead loads, appears to follow a pattern. First, there is a period where box suffers rapid compression. This starts the instant the load contacts the box. Some of this stems from a flattening of the score along the horizontal edges of the box, together with a general leveling of the surfaces.

"Rapid compression continues, but at a decreasing rate, for periods ranging from a few seconds to 2 hr. There is then an abrupt transition into the second period. Here, compression continues at a uniform, but much slower, rate.

"In the third period, rate of compression again increases. And package failure finally occurs. These periods are accurately plotted on a duration-of-load curve (see Chart 2).

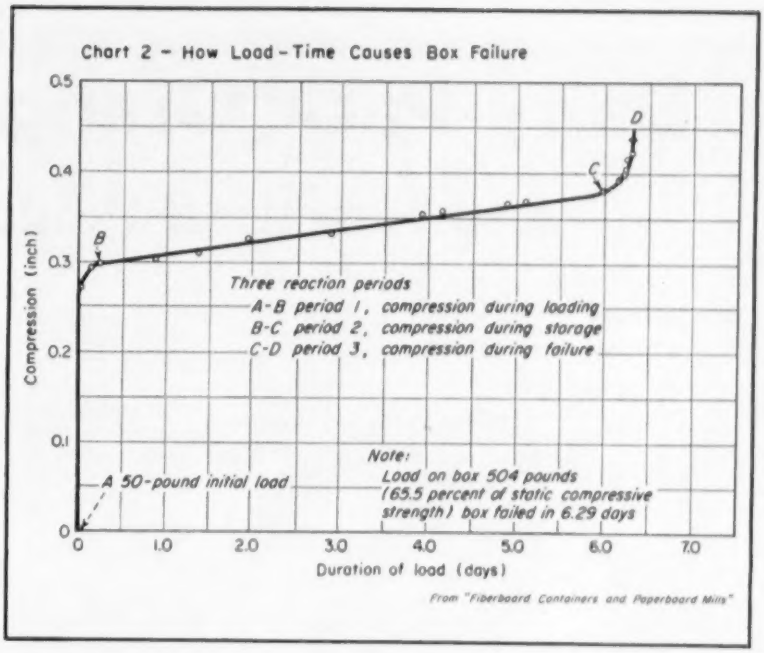
Thus, these two facts quickly became apparent: "When dead loads approach compression-test values, slight variations in this load will change box life radically. And as loads approach static compression strength of the box, failure occurs in minutes.

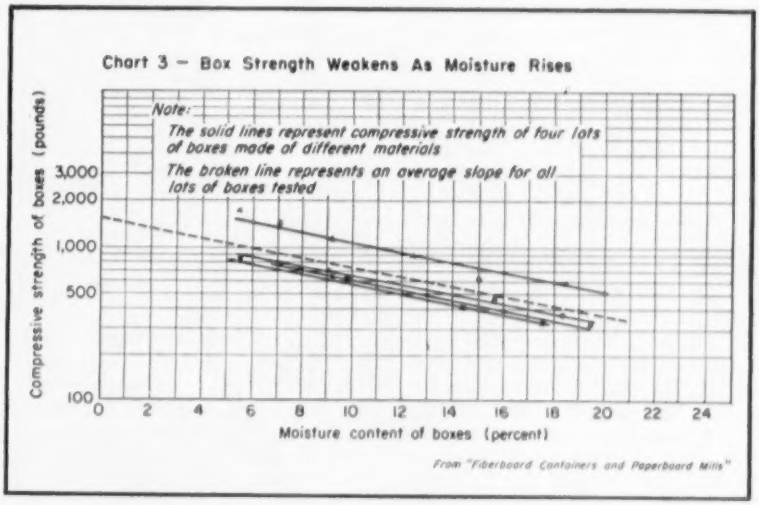
However, dead loads of about 60% static compressive strength extend test life to about a month. And for dead loads less than 75% of machine test, each 8% decrease in ratio of dead load to static compressive strength results in extending time before failure about 8 times.

This means that, at a constant moisture content, empty corrugated boxes will support dead loads of 56% for about 60 days.

This loss of stacking strength by cartons is commonly known as "warehouse fatigue."

To further complicate matters, fiberboard also loses and gains moisture. It has a moisture equilibrium content for each combination of relative humidity and temperature to which it is exposed. And increased moisture content lowers compressive strength of boxes (see Chart 3). Any tilting in piled cases causes uneven weight distribution. This, too, lowers box strength.





Moisture Alters Strength

It should be pointed out that no fatigue studies have been made at the low temperatures and relative humidities (and low absolute humidities) encountered in refrigerated warehouses.

Further complicating the box strength picture is the tremendous effect stacking or pallet loading pattern has on ultimate strength of bottom boxes in a pile. The same box in two different pallet patterns can give entirely different results.

Today, warehousemen compensate for lack of carton strength by using stacking irons (see photo), pallet crates, pallet racks, and other devices. These cut damages.

But they also boost handling and storing cost. And this additional cost may more than offset the difference in expense "saved" by selecting a cheap package instead of one properly designed to meet warehousing needs.

Great design advances have been made by the packaging industry alone.

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Dairy-Pack Orange Juice

And How Kraft Produces It

C. W. KAUFMAN
Vice-President, Kraft Foods Co., Chicago

SEVERAL TIMES during the last 50 yr. various interests in the dairy field have attempted to provide fresh orange juice as a companion product to the home-delivered bottle of milk.

Basically, the idea had a great deal to recommend it. Fresh orange juice is a highly perishable item, comparable to milk. It is one of the more common items on the American breakfast table.

Also, the additional volume it would contribute to each route truck's daily deliveries could represent a sizable increase in sales and profits.

Before our organization, Kraft Foods Co., would make a move in this field, a study of all factors was in order.

We discovered, of course, that until recently all experiments had failed. In large part, this was due to the fact that orange juice processing technology was not sufficiently advanced to solve the problems introduced by this type and form of marketing and distribution.

But within the last few years, new enterprises have sprung from this original concept. Today's technology has made it possible to overcome the marketing failures of 20 or 30 yr. ago, with the result that large quantities of "dairy-pack" orange juice are being delivered daily on milk routes.

Processing Procedures

In preparation of the new juices three separate methods are used:

►1. The simplest process carries the whole fruit through various washing procedures, then mechanically extracts the juice, removes seeds, pips, etc., packs the juice in dairy type cartons, and immediately refrigerates it for distribution and sale.

Such juice is essentially the same as that squeezed at home. However, it has the following disadvantages from a commercial point of view:

A. Its shelf life is less than seven days.

B. It contains all the active enzymes, which cause the juice to separate in a matter of a few hours.

C. Its quality is dependent on the quality of fruit available at that time.

In an effort to establish some kind of standards for this product, the Florida Citrus Commission has classified this particular product as *fresh* orange juice and permits the use of the word "fresh" in labeling and promoting it. However, distribution is limited to the neighborhood of the fruit growing areas, and thus it becomes a local regulatory problem for these particular states or areas.

►2. A more recent innovation is the stabilized juice represented by the products available in most markets today.

In preparing it, freshly extracted juice is treated in some fashion to inactivate enzymes as well as a portion of the yeast, mold, and bacteria which may be present.

This "stabilization" is generally brought about by flash heating in much the same fashion as milk is pasteurized, after which the juice is quickly cooled and packaged. A variation of this process claims to produce stabilization by treating the juice with special light rays.

This product will have several times the shelf life of the aforementioned fresh juice. And it can be extended even more by holding at 32-35F. during distribution and merchandising.

Disadvantages of this process are:

A. Variations and inconsistencies in quality due to the fact that fruit varies from day to day.

B. Heavy freight costs for shipping juice in containers from point of packaging to point of sales.

C. Deterioration during transit if extensive distribution is attempted. Juice manufactured in this fashion can be two to three days old before it reaches the grocer's shelf. If improperly handled, this could mean a significant lowering of quality at time of purchase.

D. Greatest problem, however, has been the fact that before Feb. 1, quality of Florida fruit is not usually good for juice purposes. From February to June, quality is excellent, although variable. From June to December practically no fresh fruit exists.

►3. The third process is built around preparation of a concentrate.

Here, fruit is prepared, extracted, and stabilized as in the previous operation. Then it is concentrated to the specific requirements of the individual manufacturer—in some instances 42% in others 58-60%. The higher level concentrate may be blended with fresh juice to the producer's specification.

The end product is bulk-packaged, quickly frozen at −10F., and held until wanted for reconstitution. Then it is blended with sufficient water to bring it back to its original strength, packaged in dairy type cartons, and handled through refrigerated distribution, similar to dairy products.

Advantages of such a process are:

A. It permits packing of a top quality concentrate at the height of the season, and in sufficient quantity to last for the entire year.

B. It enables the manufacturer to provide a uniformly high quality product in all areas throughout the year.

C. It allows storage of orange juice solids in a form that does not readily deteriorate, and that can be transported to a point close to the local market where distribution can be effected immediately without impairment of quality or nutritional value.

Disadvantages of the process are:

A. Investment required to purchase a full year's supply in a relatively short period, and

B. The higher initial cost of the concentrate.

How They Compare

In evaluating the three processes, it is important that certain things be kept in mind:

1. Obviously, the only juice that is "squeezer-to-glass" fresh is that prepared at home.

2. Nearest approach to this is that described under Process 1. However, this process is self-limiting and could never, in our present stage of technical know-how, become a national factor.

3. The second process has already taken a very important and significant role. Fleets of trucks are now moving daily out of Florida, carrying large shipments of dairy-pack orange juice for distribution in the east central and west central sections of our country.

Concentrate prepared from juice of top-quality, tree-ripened Florida fruit is frozen and stored at —10 deg. F., then reconstituted and packaged at distribution center. Year-'round uniformity and extra shelf life assured

It should be remembered, however, that this business can only be built and made to grow on quality. Split-second scheduling, as well as mechanical refrigeration protection, is required to bring this juice to the customer without serious impairment in quality.

Assuming these problems surmounted, the processor is still faced with the shortage of fruit during the off season.

To overcome this handicap, it is suggested that:

A. Fruit be held in cold storage during this period. (But anyone associated with the field realizes that this is impractical for large production.)

B. Single-strength juice be stored in frozen form. (Cost of such an operation—containers, storage, handling, etc.—makes it prohibitive.)

C. Concentrate be stored and blended with fresh fruit during different times of the year. (Actually, this is the only feasible approach. And it becomes increasingly obvious that the trend is in this direction.)

As an example, the report last Sept. 20, of the Florida Citrus Commission shows 3,000,000 boxes of fruit used in dairy-pack orange juice in 39 weeks, beginning Dec. 1, 1954, or approximately 75,000 boxes a week.

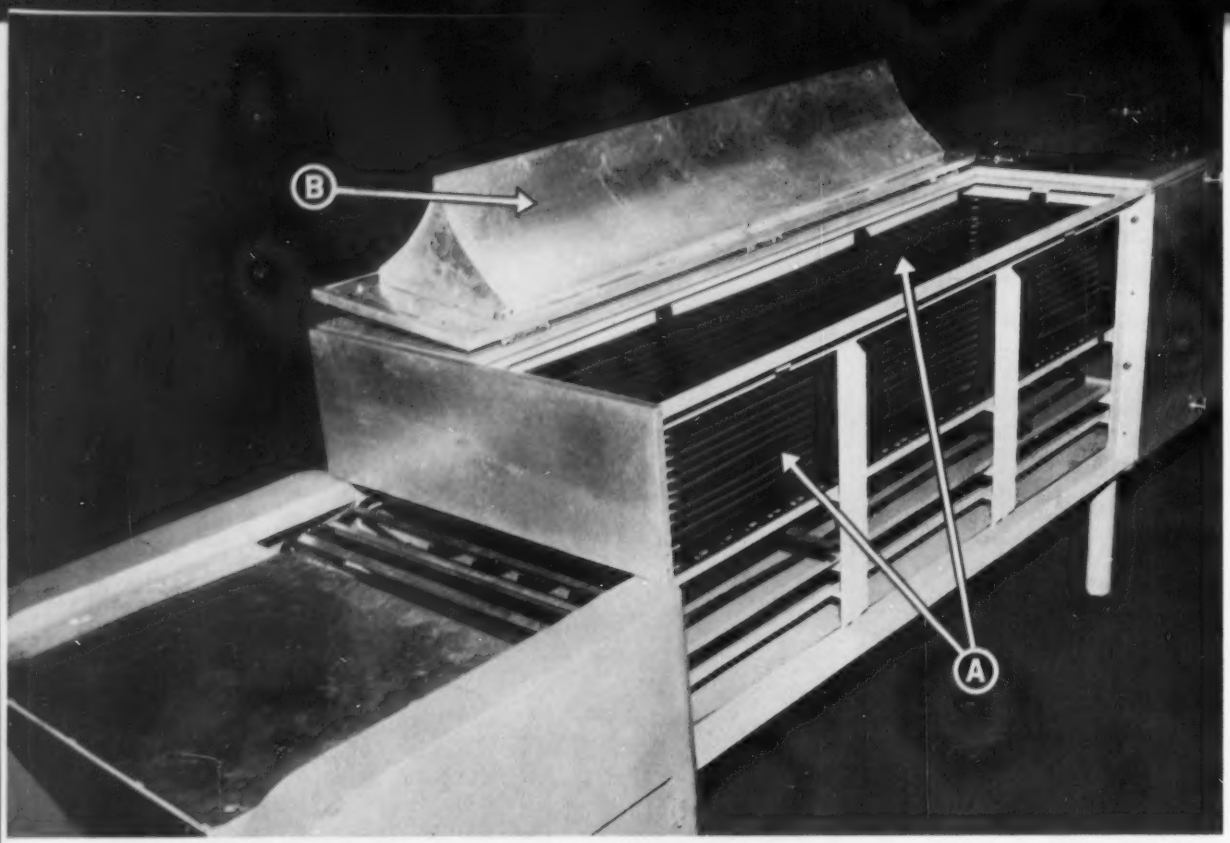
Yet, for the weeks beginning Sept. 1, actual usage was only slightly more than 6,000 boxes per week. This indicates that the dairy-pack juice produced during this period was not made, in any considerable part, from fresh fruit.

Third Process Insures Uniformity

If we examine the third process, we find that dairy-peak products can be

(Turn to page 191)

"We feel that any nationally advertised product bearing the Kraft label should have consistently uniform quality at all times and in all places."



CONFECTION COOLING time is cut by this special radiant unit. Also, shrinking and cracking are curbed. Featured are vertical coils (A) and reflector (B) that prevents condensation. (Maker: Reflectotherm, Inc., Cincinnati.)

Processors Probe New Methods

★ **RADIANT COOLING . . . Affords Special Benefits**

★ **HEAT TRANSFER . . . Evaluated by Query Technique**

★ **CONTINUOUS COOKING . . . The Fast, Thin-Film Way**

★ **MYLAR BELTS . . . Excellent for Cooling Tunnels**

Part I of Two-Part Article

FE STAFF

SHARPLY SPOTLIGHTED at the recent 10th annual conference of the Pennsylvania Manufacturing Confectioners' Assn., in Lancaster, were the latest continuous-processing techniques and also the newer quality promoting ingredients and materials.

RADIANT COOLING

The speaker on chocolate cooling, or setting—E. H. Morgan, of Reflectotherm, Inc., Cincinnati—particularly pointed to the significant difference between cocoa butter crystals resulting from radiant cooling and those formed by air.

Various fats were crystallized by cooling. And here air-cooled samples showed surface cracks and a tendency to set up convection currents within them. In contrast, radiant-cooled samples had a higher gloss.

But most notable was the latter's higher melting point upon re-heating—important to confectioners using chocolate or cocoa butter, since it can mean longer shelf-life and better appearance.

Cooling rate of chocolate coatings was test-determined, using caramels for centers.

Here, the rate with radiant samples exceeded that of convection ones before and after active crystallization in both light and dark chocolate.

Most significant was the difference in temperature at start of crystallization—point at which a sharp break occurs in the cooling curve.

For dark chocolate, the break was at 80F. for radiant

and at 77F. for convection samples. For light chocolate, it took place at 75.5F. and 74F., respectively.

Now being checked is vapor permeability of chocolate cooled by the two methods. There is reason to think that radiantly cooled product should be more resistant to moisture migration, thereby increasing shelf-life and reducing oxidation of fat, especially in vegetable compound coatings.

In addition radiant cooling proves exceedingly effective in setting solid or molded chocolate. Equipment has been installed to solidify 10-lb. cakes of pure chocolate for confectioners' use. Preliminary testing indicates a 50% boost in production.

In controlled tests at a Chicago plant, chocolate from the same tempering kettle was fed to a radiant cooling unit and an adjacent air-cooled unit on enrobing lines. **Here, high quality product came out of the radiant cooler in ⅛th the time of the air unit. Center of the radiant product was remarkably cool.**

Corrugated paper cups were chocolate-filled to ¾ in. and simultaneously cooled by the two methods in about 9 min. Center temperature of radiant samples was about 3 deg. cooler. And the chocolate, when cut, was definitely harder and of finer crystal structure.

On Hard Candy

Also effectively cooled in radiant tunnels is hard candy. In most cases, said the speaker, cooling of this type of confection is best accomplished by using combination radiant and convective equipment to remove heat in the shortest possible time.

Occasionally hard candy cracks excessively. Likely, the temperature gradient (difference) through the piece is too great here. But the radiant cooling removes internal heat to overcome this trouble.

If the piece from the former must be wrapped (as with candy canes), it is best to remove heat quickly. A tunnel, using radiant cooling, will reduce cooling time 30 to 50%.

Here, something unusual was encountered: Subjected to cold (therefore dry) air, hard-candy temperature fell rapidly and drops of water formed on the surface of the candy and started to drip.

This candy was very low in moisture content and flavored with highly volatile aromatic oil. Evaporation of this oil was so intense that the surface temperature of the piece fell below the dewpoint, causing condensation.

Perhaps some sticking of hard candy in bins in well air-conditioned rooms is brought about in this way.

A problem in enrobing involves temperature of the center. These definite limits should be established: To prevent formation of low melting-point crystals, 75F.; and to minimize cooling-tunnel load, 80F.

In some instances, trays of centers pick up too much heat when kept too long in an 88-90F. enrober room. Conversely, some are brought from lower-temperature holding rooms for direct feeding into enrober. Centers should be properly conditioned by exposing them to a suitable temperature prior to enrobing. Here, radiant heating or radiant cooling, as needed, may be used.

Crystallization Aspects

Another point: Water icings (saturated sugar solutions) or protein-type coatings can differ radically due to type of crystallization. Fast crystallization produces a multitude of fine, high gloss crystals. Slow crystallization forms coarse, dull-finish crystals.

An important difference (usually overlooked) is relative vapor permeability. Fine crystalline structure is much less permeable, and tends to isolate the center from ambient conditions. In a piece subject to too much loss of moisture or oils, fast crystallization of coating is highly desirable.

Secret of fast crystallization in sugar solutions lies in quick removal of excess moisture. A dry atmosphere is of prime importance. However, radiant heating is highly desirable to provide necessary heat of vaporization, since crystallization is accomplished within seconds.

Where gelatin or albumin are used, it may be quite desirable to follow up with cooling to give added firmness to the coating.

Equipment affording such advantages in production rate and quality is not expensive. True, it may cost more per foot or pound of equipment. But in most cases, cost per pound of product is less.

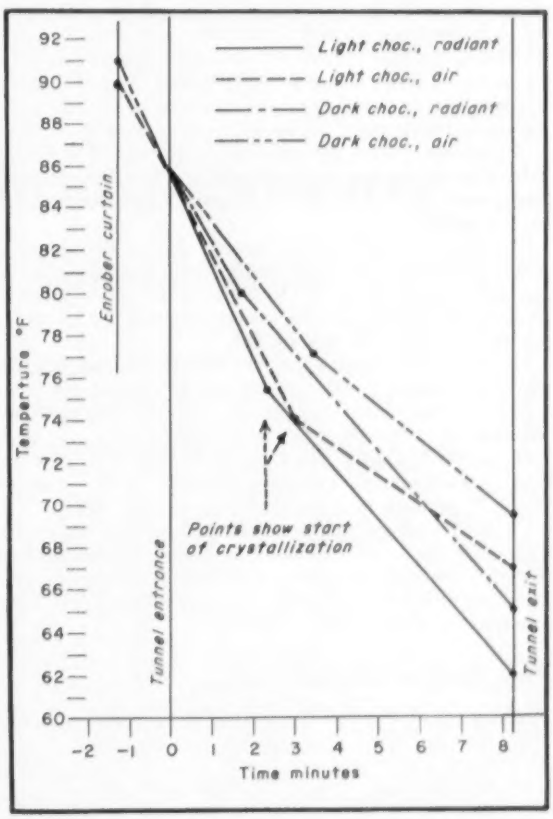
The speaker said that where air circulation is not required, operating cost of a radiant tunnel is considerably less than that of conventional units. For example, one plant required a 20-ton refrigeration capacity for its air-cooled equipment compared to 9 tons for a radiant-cooled unit.

HEAT TRANSFER

John P. Bolanowski, The Girdler Corp., Votator Div., Louisville, Ky., pointed out that confectioners should check the important role heat transfer plays in candy making by applying these questions:

1. How much of total steam required is actually going into ingredients? How much is radiated into the room?

Radiant Way Speeds Cooling



CURVES compare radiant with air method of cooling confections. Note that crystallization starts at higher temperatures when employing radiant unit.

2. How easy is it to maintain day-to-day and hour-to-hour control of quality? And how effective is this control?

3. Is the operation continuous? If not, why not?

4. If it's a batch operation, would converting to a continuous process release floor space? Reduce scrap, labor, personnel training, and supervision? Ease quality- and production-control loads? Make working area more comfortable?

5. Could procedure that now includes evaporative boiling (as in starch jellies, caramelization, or various syrups) be eliminated to reduce steam costs and increase production, per unit, of goods turned out?

6. Does the system lend itself to sanitation from a standpoint of time, labor, material, and ease of cleaning?

Mr. Bolanowski pointed out some possibilities on how continuous heat-transferring and processing has been engineered to do more work in the candy field:

Continuous tempering of 2,500 lb. of chocolate per hour requires pumping it in molten form from a tank through a Votator-type heat exchanger. Cooling chocolate from 110-115F. to 85-90F. requires a 6-in.-dia. Votator heat-exchanger cylinder that is approximately 48 in. long with 6 ft. of heat-transfer surface.

Making 6 sq. ft. of metal surface into a kettle would give it only a 6-gal. capacity. This is large enough for an experimental kettle, but too small for any practical use in a chocolate line.

Now to another example—making starch jellies by continuously pumping a slurry of ingredients through a 2-or-3-cylinder Votator unit. Slurry (20 to 23% moisture) is heated from 160F. to 280-285F. and cooled in the Votator to 200-210F. before it is directly piped to depositor.

To produce 4,000 lb./hr. of starch jelly continuously requires two 6-in. cylinders (12 sq. ft.) for heating, and one 6-in. cylinder (6 sq. ft.) for cooling, for a total of 18 sq. ft. of heat-transfer surface.

This is enough square-feet of metal jacketed for steam or water to make about a 20-gal. kettle. And the check-question would be: How many pounds of starch jelly could be cooked and cooled an hour in such a kettle?

To continue, here are some of Mr. Bolanowski's reasons why overall heat-transfer coefficients of Votator apparatus are greater than those from equipment operating on different principles:

1. There's a high ratio of transfer surface to volume of treated material. For example, in cooking starch jellies at 4,000 lb. per hr. from 160 to 280F. in 40 sec., amount of product to heating surface is approximately 25 lb. to 12 sq. ft. (roughly 2 lb. per sq. ft.).

2. Using the same figures (4,000 lb. of starch jelly), equipment offers a high ratio of agitation to volume being processed. At 4,000 lb. per hr. pumped through two cookers, it takes 40 sec. for temperature to rise from 160 to 280 F. During this time, each shaft, with pins and scraper blades, spins 450 times through 25 lb., or about 3 gal. of product, in a confined ½-in. moving film.

3. Blades affixed to the spinning shaft perform one of the most important functions necessary to efficient heat transfer—removal of product film from heat-transfer wall, or cleaning it 1,000 to 1,400 times per minute, depending on rpm. of shaft.

From Batch to Non-Stop

Conversion of a batch operation to a continuous one calls for more than a continuous heat-exchanger. Operational procedures and conditions vary among products. Nevertheless, basic steps are similar and, in most cases, solvable.

Ingredients going into a pre-mix must be blended in proper proportions so as to be pumpable. Products like starch jellies, caramel, etc., should be formula-compounded to include only the moisture required in finished goods (±1%).

Too, the slurry must be blended to exclude air and to provide gentle, but complete, blending so that the batch at the top of the blender is the same as that at bottom, middle, and sides.

Product cooled to a controlled crystallization (as in chocolate tempering) must be prepared with ingredients (fats) in solution or molten form.

Purpose and function of all ingredients in a formula must be clearly understood. In general, any formula change is usually minor and aims to be beneficial to the product. It is usually easier and less expensive to modify formula-to-equipment rather than equipment-to-formula.

Latest development in the candy field is continuous fudge production. Procedure consists of making a pre-mix of all ingredients in a jacketed kettle equipped with suitable agitation. Pre-mix, containing the ingredient percentages required in finished goods, is kettle-pre-heated to 160F., then pumped through a continuous heater and cooler.

In pilot-plant operations, heating to 290-295 F. and cooling to 145-150 F., were found satisfactory. However, these conditions can vary.

CONTINUOUS COOKING

How confections are continuously processed in new versatile Turba-Film evaporators, was discussed by Calvin L. Rasmussen, Rodney Hunt Machine Co., Orange, Mass.

Basic in the principles of these units are the thin, turbulent film and the short time materials are in process (see "Solids Boosted by Spiralling, Thin-Film Evaporation," FE June '55, p. 64).

Caramels may be processed non-stop with a continuous caramelizer ahead of the evaporator. This may be accomplished by heating to 300F. with a 3-min. holding time to produce desired caramelization.

Material may then be continuously fed to a Turba-Film unit, where excessive moisture is removed. Finished product emerges from unit at about 190F. after about a 20-sec. evaporating time.

Other confections are handled as easily as caramels (eliminating caramelization) to produce an improved product.

By thus processing confections in a thin turbulent film, a "U" value (overall heat-transfer coefficient) of 250 and better may be expected. Amount of material in process at any given time is very small, thereby making the operation very easy to control automatically and continuously.

Another important feature is that operating conditions, when processing caramels in a No. 5 Turba-Film unit, may be varied quite easily so that a range of feed rates from about 4,000 to 8,000 lb. per hr. may be obtained.

Hard candy may be processed at a feed rate of about 2,000 to 4,000 lb. per hr., with a residual moisture of less than 1%, and in some cases less than 0.5%.

Short contact time in processing produces an improved quality product of better color and flavor, more nutritional properties retained in heat-sensitive ingredients, and better keeping qualities.

No deposits or build-up occur on heating wall, since violent turbulence imparted to material by rotor keeps it clean.

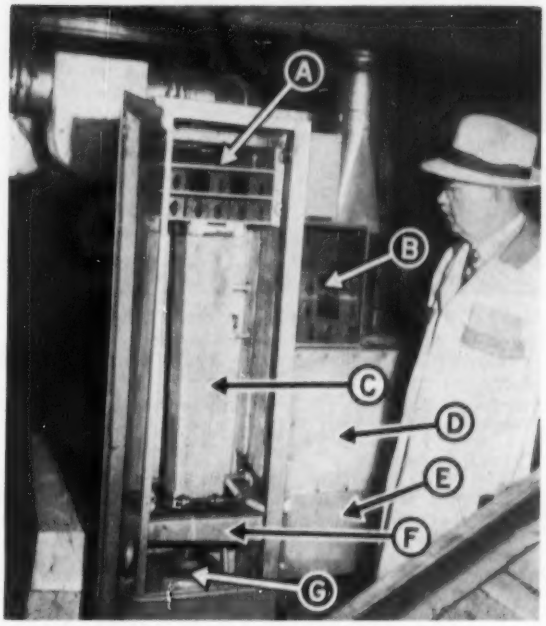
Units are very easily cleansed by flushing with water. Here, the turbulent water motion set up by rotor is usually sufficient. However, if a more thorough clean-up for a new product is desired, rotor may be easily pulled and the cleaning accomplished in the usual time for a "cook" kettle.

(*Turn to page* 162)

'House is smoked in 3½ min . . .

WITH fireless generating system installed, operator can actually walk into smokehouse with little, if any, smarting of the eyes. And there are no messy accumulations of tars and resins requiring periodical removal. Seen is President Joseph Slotkowski inspecting a cage-load of Polish sausages.

. . . by new-type friction generator



CLOSEUP of compact friction-principle generator. (A) is 3-shelf weight-holder, (B) weight storage cabinet, (C) 3-ft. log, (D) water-spray unit, (E) 5-ply screen filter, (F) enclosed rotating abrading disk and perforated water pipe, and (G) motor. Unit has smoke coming at the press of a button, is easy to maintain.

Fireless Smokehouse Smoker

—Its Advantages —How It Works

Fast abrasion of wooden log by rotating, bladed disk creates smoke within seconds and fills a 'house in less than 4 min. . . . Amount of smoke controlled by varying the weight-pressure on log

FE STAFF

SOMETIMES a little idea will give birth to a significant—and practical—development.

Take the fact that smoke comes off when you cut wood with a dull-bladed table-top saw.

Noting this phenomenon one day, Harvey Rasmussen, Jr., of L. C. Spiehs Co., Inc., Chicago, asked himself: "Couldn't this somehow be applied to generate smokehouse smoke without the use of fire?"

As practical men, Mr. Rasmussen and his associates then set their minds to devising a fireless, or friction type, smoke generator, based upon the idea.

They spent months at the task, and finally built a radically new kind of smoke generator. Specifically, this unit produces smoke through the abrasion created when a weighted wooden log is brought vertically into contact with a horizontal high-speed rotating metal disk. The disk has eight broad teeth incorporating carbonized steel blades.

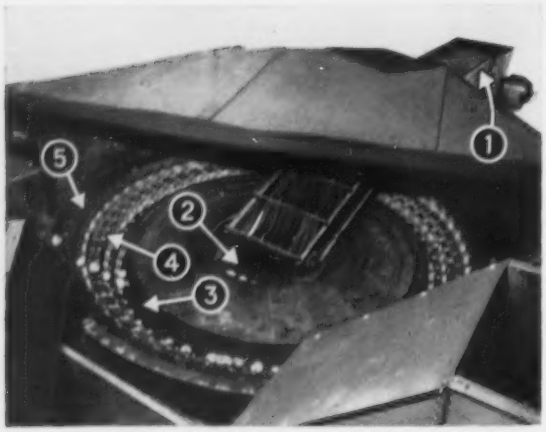
Amount of smoke can be controlled: The greater the weight applied upon the top of the log, the more the smoke.

13 Benefits Cited

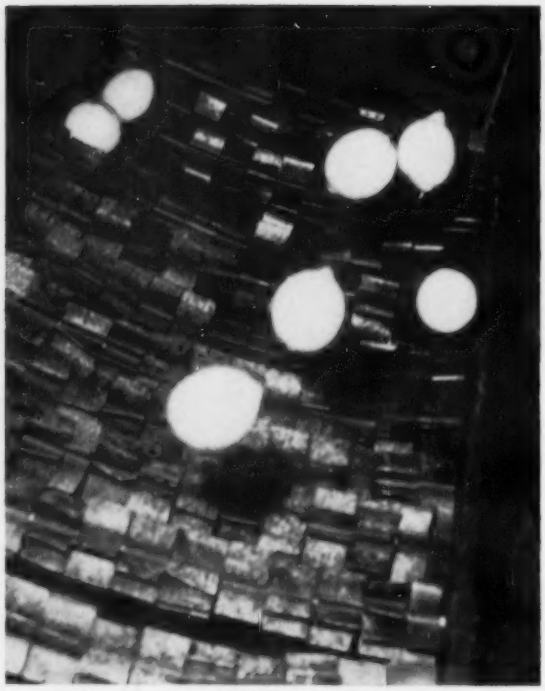
This radical smoke generator was recently installed in the Chicago plant of Slotkowski Sausage Co. where, according to President Joseph Slotkowski, it is racking up these notable advantages:

1. It substantially reduces the time required to produce smoke, as well as to stop it. Once the motor driving

(*Turn to page 151*)



NEW SORTER in action. Lemons, fed in by conveyor (1), roll down chute to center of rotating wheel (2), then move outward under rubber curtain (3). Movable steps of shuffle feeder (4) transfer fruit to wire cradles (5). At correct instant, gate in each cradle opens, permitting fruit to fall into proper delivery lane.



ONTO CUSHIONING rubber baffles fall lemons dropping from sorting wheel. Slipping through baffles, they're caught by delivery lane that moves them to filling machine.

Grades by Color at 40 a Second

Lightning-action unit scans lemons electronically, sorting them into four color grades . . . And then it automatically packs them and conveys cases to storage

H. C. HOOD

Engineering Editor, McGraw-Hill Pacific Coast News Bureau, Los Angeles

AN AMAZING new machine—comprising highly sensitive electronic color-discriminating equipment and ingenious automatic materials handling devices—is now at work sorting and packing lemons.

It does it according to fruit color at the high rate of 40 per sec., and with significantly greater accuracy of discrimination than is possible with manual labor.

Developed jointly by U. of California and Food Machinery & Chemical Corp., and built at the latter's Riverside plant, the unit is installed in the Santa Clara Lemon Assn.'s packing house at Oxnard, Calif.

The new installation differs in a number of respects from the one at Somis Lemon Assn. (FE, Apr '56, p. 46.), although their hourly output is approximately the same. Whereas the Somis installation makes use of six ganged sorting machines, FMC's device is essentially one machine.

After going through the conventional scrubbing, waxing, and size grading operations, lemons are fed to the inclined chute that delivers them to the center of the new unit's 8-ft sorting wheel. Soft rubber flags hang at regular intervals in the path of the traveling fruit to retard their speed.

SCANNING UNIT comprises two sets of eight photocells (6 shown) that receive light reflected from lemons in cradles below, thus sort them into four color ranges.

The sorting wheel, which has the general shape of a huge shallow dish, turns at 40 rpm. It releases the lemons from its rim at a tangent and into the proper delivery alleys. There are four of these alleys, spaced at 45 deg. intervals (see accompanying drawing). Each receives lemons of a specific color—yellow, silver, light green, or dark green.

Lemons are kept from piling up on the sorting wheel by means of a suspended curtain that, with the aid of centrifugal force, spreads them in a single layer.

Located on the periphery of the wheel are 60 wire cradles. Each one of these holds a single lemon and has an individual gate that opens at precisely the correct instant to allow the lemon to fall into the proper delivery alley. A solenoid-operated

latch releases the gate, while counterbalance weights assure their closing after the lemons have been released.

The tricky problem of transferring the fruit from the curtained section of the wheel to the circumferential cradles is handled by a rotary shuffle feeder. This comprises movable wooden steps that literally "walk" the lemons up the inner slope of the wheel. There are seven such steps, each consisting of 60 segments.

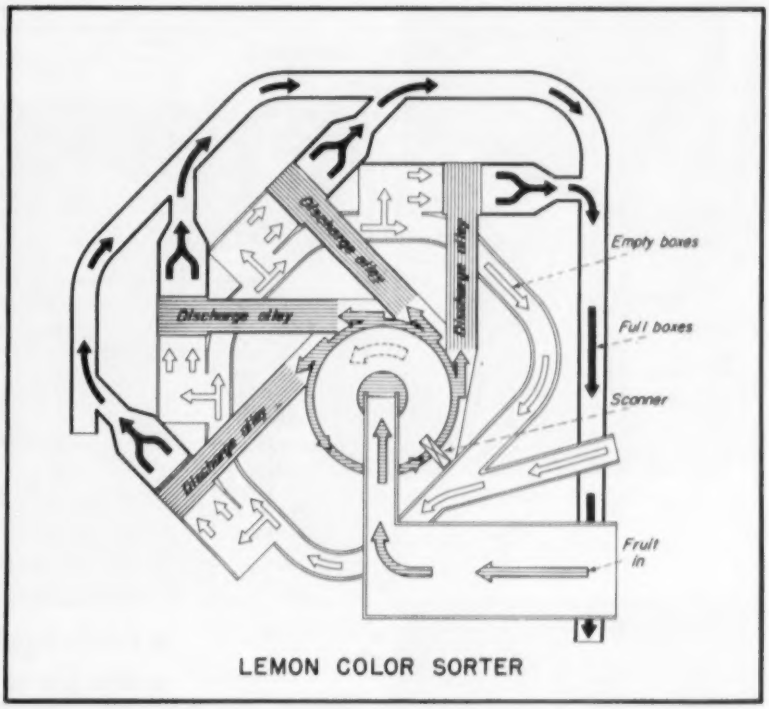
Four of the steps move up and down, actuated by a circular cam track beneath the sorting wheel, while the others are stationary. Each segment of the movable steps is free to move independently of its neighbor, and during wheel rotation its travel simulates a wave motion.

Step-by-Step Procedure

Let's follow the travel of a typical lemon as it leaves the flat center section: Rolling out from under the curtain and onto the lowest of the steps, its initial movement is arrested by the projecting second step. When the step segment rides up on the high spot of the cam track, the lemon is 'walked' up to the level of the second step, which is stationary.

By centrifugal action, it then rolls across the top of this step and onto the next movable one. And the process is then repeated until the lemon rolls into the wire cradle on the rim of the wheel.

Because of the irregular shape of lemons, varying their roll, some of the cradles will occasionally remain empty.



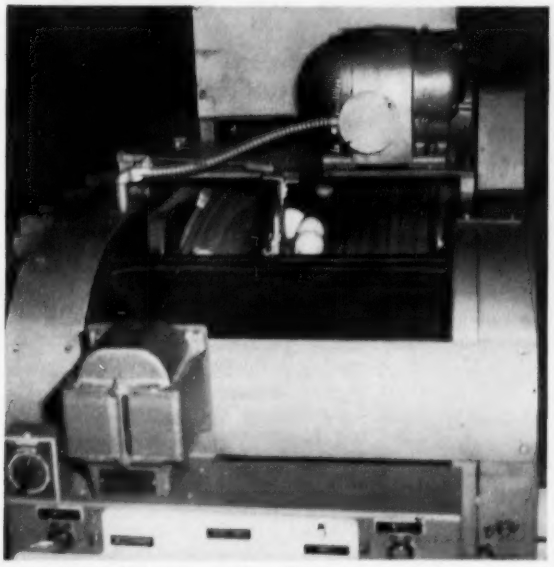
LEMON COLOR SORTER

For economically feasible operation, however, 80 to 90% of these loading stages must be occupied.

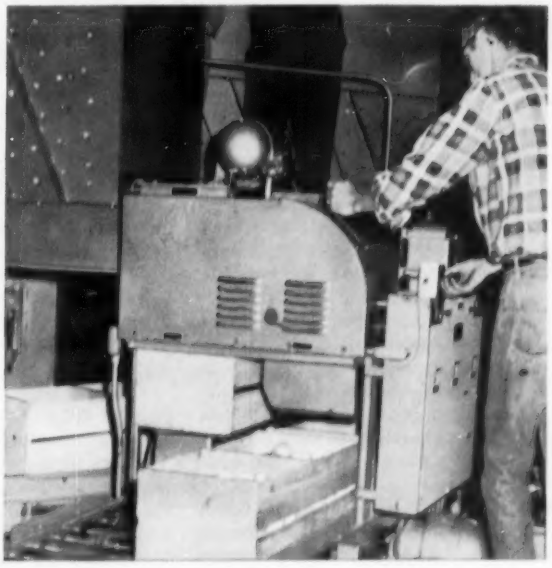
A 16-photocell scanner (with associated electronic circuits) and a memory wheel (mounted below, but on the same shaft with the sorting wheel) constitute the "eyes" and "brains" of the machine. Reflected light from two beams of colored light, impinging on the whirling lemons from opposite sides of the scanning unit, is bounced back to the light-sensitive units of the photocells.

Electronics of the machine discriminate between impulses initiated by the four color ranges and thus activate the memory device. This, in turn energizes the proper telephone-

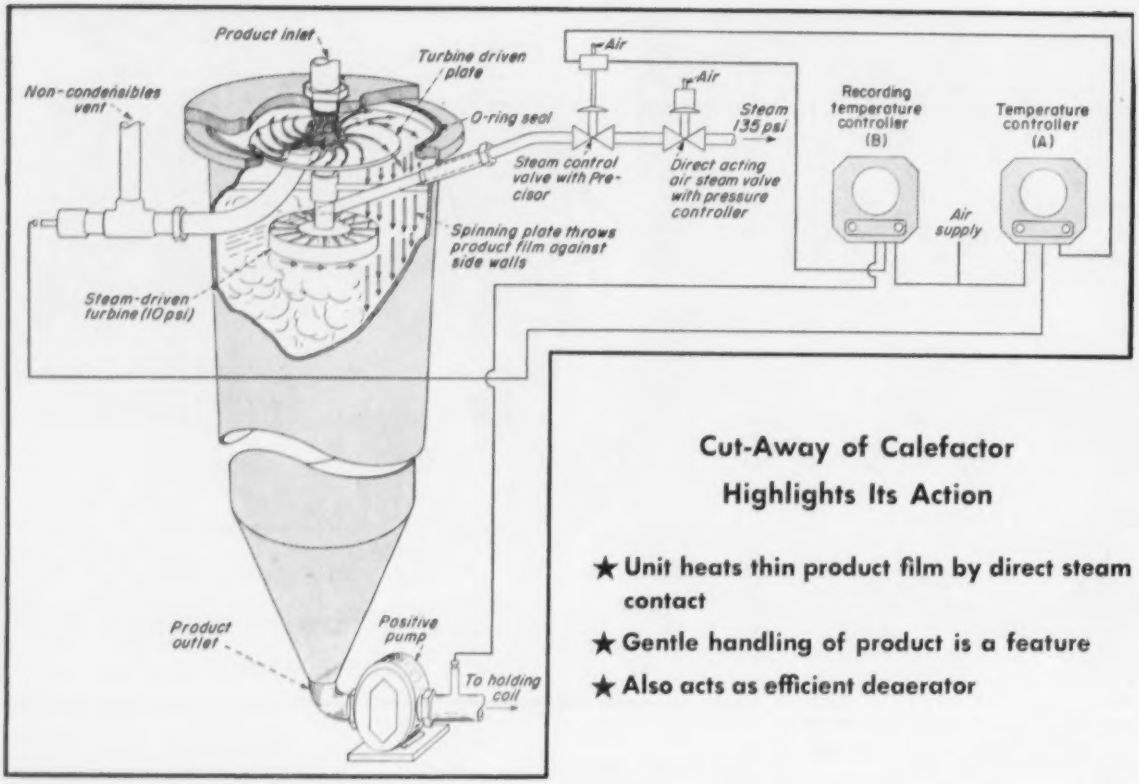
(Turn to page 177)



AUTOMATIC fillers are located at end of delivery lanes. Here, deflectors move from side to side, diverting lemons to both compartments of box below.



EACH MACHINE alternately fills boxes on front and rear platforms. As one is loaded, other is raised so that the two filling chutes extend down inside it.



Cut-Away of Calefactor Highlights Its Action

- ★ **Unit heats thin product film by direct steam contact**
- ★ **Gentle handling of product is a feature**
- ★ **Also acts as efficient deaerator**

New-Principle HTST Unit Plays Top Role on Gerber Line

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering," San Francisco

RARELY has a thermal engineering development stimulated food processors to such a keen interest in steam-injection heating as has the new unit known as the Calefactor.

Despite its surprising simplicity of design, this short-time high-temperature heat exchanger incorporates a relatively new engineering principle. It provides a means—long sought—of sterilizing or heating a thin product film by direct contact with the heat source (steam).

▶Currently, it is being used for a number of products of varying viscosities (liquids and liquids with discreet particles), and it is proposed as a heater or heat-exchanger for many others.

▶It handles products gently, no turbulence or agitation being required for effective heat transfer. In addition, it acts as an efficient deaerator.

Evolved by the process development section of the research department at Gerber Products Co., Oakland, Calif., and made by The W. J. Fitzpatrick Co., Chicago, it is the result of more than seven years of research in the field of steam-injection heating.

Project Brief

About five years ago, when the project was already on the way to success, the aim of the effort was realigned to develop a heat-exchanger that could be adapted to a conventional aseptic canning system.

While there are other heat-exchangers available for this purpose, a single unit of the most desirable type would not satisfactorily handle all products and would lack required production capacity planned for this system. And while multiple units could be used for some products, this would entail a costly capital investment.

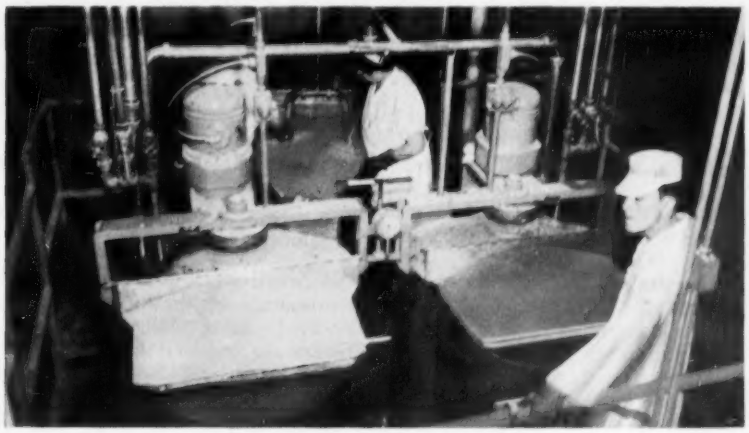
Further, it was specifically desired to avoid severe product turbulence and also burn-on. The latter adversely affects product quality, while presenting problems of production capacity and increased labor expense.

And, since steam-injection heating could be used for the products planned for this system, the decision was made to develop a different heater for an aseptic line.

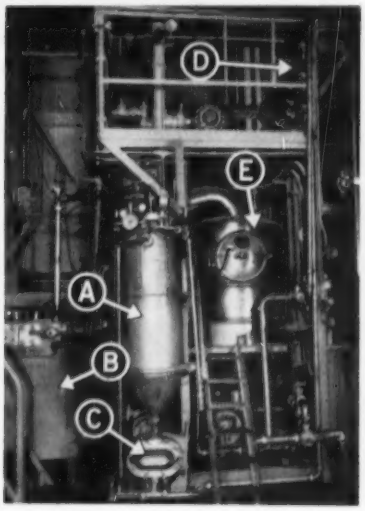
As is often the case in research projects, the successful development of the Calefactor then led to the origination of an entirely new processing line—one for puddings and various

1 **CANS** (30 lb. each) of frozen product—as fruit purees—are "surface defrosted to make product removal efficient.

2 **THUS EASILY SLIPPED** out of cans, material is then fed through throat to riving machine.



3 **FORMULATION OPERATOR** (lower right) valves the 40-deg.-F. product across inspection plate (center) to tanks (rear).



4 **THE CALEFACTOR**—heart of new compact process. Flow to this unit—seen at (A)—is from pressure pump (B). Next, material goes through pump (C) to holding-coil (D) then into vac pan (E). Product is subsequently pumped to filler and seamer.

Continued→

pureed fruit and vegetable products.

The unit is comprised of a 16-in.-dia. stainless steel cylindrical shell having a cone-shaped bottom, at the lower tip, which is the discharge outlet. It is noted that diameter and length of the shell may vary, depending upon through-put requirements.

Inside, and directly below the head plate, is a 12-in.-round product distribution plate centrally fixed and connected by a short axle, through a bearing, to a steam turbine rotor. The axle is centered by a spider support attached to three brackets by means of Allen screws, making the entire unit removable for easy cleaning.

A steam jet, which both powers the turbine rotor and provides heat to sterilize the product, enters obliquely through the shell and discharges directly on the turbine fins. For normal operation, plant steam pressure (135 psi.) is reduced to a desired controllable pressure.

According to product viscosity, this will develop a turbine speed of 900 to 1,800 rpm., and a temperature inside the shell ranging 210-300 deg. F. The energy required to turn the rotor dissipates steam superheat.

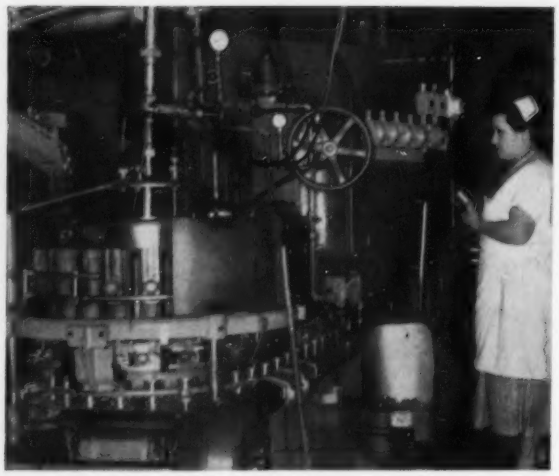
Volume of product entering the unit, its viscosity, and its specific heat all tend to affect temperature controls, which then determine the volume of incoming steam and, consequently, the turbine's rpm. which, of course, varies the speed of the plate.

Temperature differentials between incoming and outgoing product are also a governing factor of steam flow. This, too, affects the rpm. of the rotor.

Products of 10-20,000 centipoise were used as a basis for these calculations.

To maintain a predetermined uniform pressure in the unit, noncondensables are valved out through a discharge vent. Intake of this vent is positioned directly under the round product plate in order to eliminate the possibility of product being car-

5 INTERLOCKING recording controllers maintain uniform temperature in Calefactor. Use of reversed Moyno pump (just below) is innovation. It moves heated product from vac-pan pot (with no chance of vapor locking) to filling machine. Note holding coils (top).



6 PRODUCT FILLER and can-seamer operate at 500/min. Canned product is then sterilized and cooled.

ried out with the noncondensable gases. An "O" ring Neoprene seal (¼ in. dia.) provides a hermetic headplate seal.

Proper venting is critical to desirable operation and, of equal importance, makes the unit an excellent deaerator. The temperature at which the product enters the steam atmosphere of the shell (40F.) allows time for removal from the thin product film of considerable occluded oxygen before it reaches 212F.

One product processed in this unit shows a 10-fold reduction in oxygen content when compared to that occurring with the conventional batch-cooking process.

A pressure sight-gage on the Calefactor enables the operator to determine if the vent valve opening is adequate. If this gage shows a pressure in excess of that of the vapor pressure of the product being heated, at the temperature at which it is being heated, the vent valve is slightly opened. Thus temperature-pressure relationships are properly maintained.

Pressure equilibrium is assured by a positive displacement piston type pump that delivers product through an inlet in the center of the headplate. Flow through the unit is rapid, with product residence time being less than 1 sec. A positive displacement rotary pump is closely connected to the discharge cone and moves product to the subsequent holding coil.

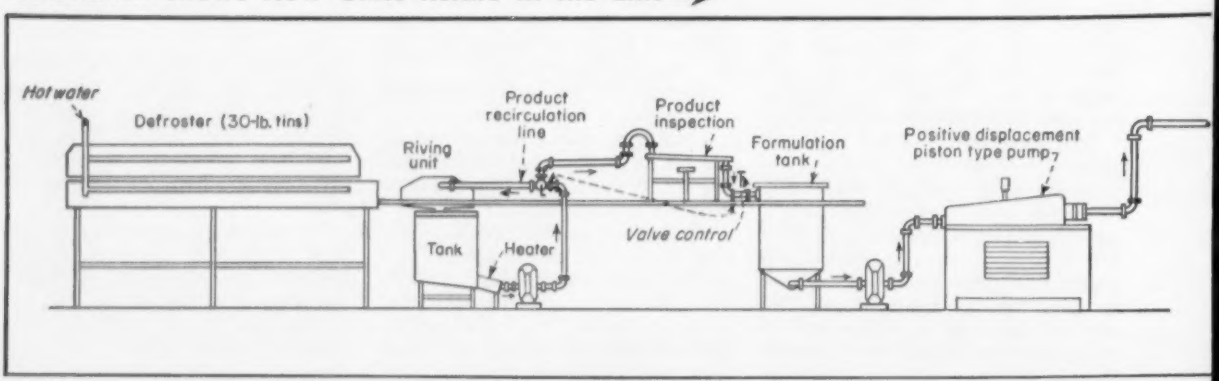
Accurate and uniform temperature control of any steam injection unit often presents some unusual problems. The principal difficulty in controlling temperature in such heaters is the instantaneous product-heating reaction obtained. Many conventional temperature control instruments will not react rapidly enough to provide smooth, accurate, uniform control.

Regulating Product Temperature

First attempts to control product temperature in the Calefactor only involved sensing of the vent temperature of the vessel. But this procedure proved to be inadequate, since there occurred rapid changes which were not definitely related to the product temperature.

The next step—sensing only the product temperature on the discharge side of the unit—also proved to be inadequate, because most temperature

Flowsketch Shows How Units Relate in the Line→



changes occurred too late for correction. Literally, this was "correction after the fact", and it obviously would not solve the control problem.

► **However, these two trial procedures pointed to the possibility that the results of the two sensing points might be combined to provide adequate and accurate control.**

Dual Control Does It

This led to the installation of two automatic-reset temperature controllers —one sensing the temperature of the vented noncondensables, the other sensing the temperature of the product.

The air output (controlled air from each instrument) was directed into an averaging relay. The average pressure of both instruments was transmitted from this relay to the air motor valve controlling the steam flow to the unit. Then the vent temperature instrument (representing the interior atmospheric temperature of the unit) acted as an anticipator of the temperature effect on the product, and with extreme rapidity.

The slow reaction of the other instrument sensing product temperature balances the erratic reaction of the first, consequently resulting in a very constant proportioning transmission of air to the air motor valve controlling the steam input.

Start-Up and Process Example

The instruments are preset at the desired temperature of the product, with the index of the instrument sensing the inner atmospheric temperature (in vent) usually set 4-5 deg. F. above the desired product temperature. Then product flow is started and the psig. air output from both temperature instruments is checked by the operator.

If, after operation begins, the temperatures of the two instruments are more than 10 to 15% apart, then the vent sensing instrument is adjusted to correct the difference.

The instrument reset adjustments are made according to the reaction rates. Generally, the vent sensing instrument is on a fast reset, while the product sensing instrument is on slow reset.

At Gerber's in Oakland, the Calefactor is used to sterilize a number of products, among which are puddings and frozen fruit purees. To simplify an exposition of this line, fruit purees will be used as our processing-operation illustration.

Thawing of the 30-lb. tins of frozen-fruit purees by the conventional method of allowing the material to defrost at room temperature requires time, is costly, and is dangerous to product quality. When using this method, a large proportion of the frozen product reaches bacteriological and enzyme-activity temperature before the tin is emptied.

Also, a product so defrosted becomes part liquid and part hard-frozen, and this mixture adversely affects operation of the subsequent riving machine.

Unit Sequence

To eliminate these problems, the company's engineering and process development departments devised the "surface defroster." (This unit is seen at the start of our accompanying flow diagram, wherein are depicted the various pieces of equipment employed in the operation, and whose actions will now be described.)

The defroster is a tunnel in which the canned product is exposed to high temperature (hot water) for a period just long enough to defrost the surface of the material so it may be more easily removed from the can.

Frozen product is fed into this unit on dual conveyors placed in a longitudinal position. The time of residence is controlled by speed of the chain conveyors. Hot water, thermostatically controlled, is sprayed from above and below onto the cans. Speed of the unit and water temperature are adjusted for various products.

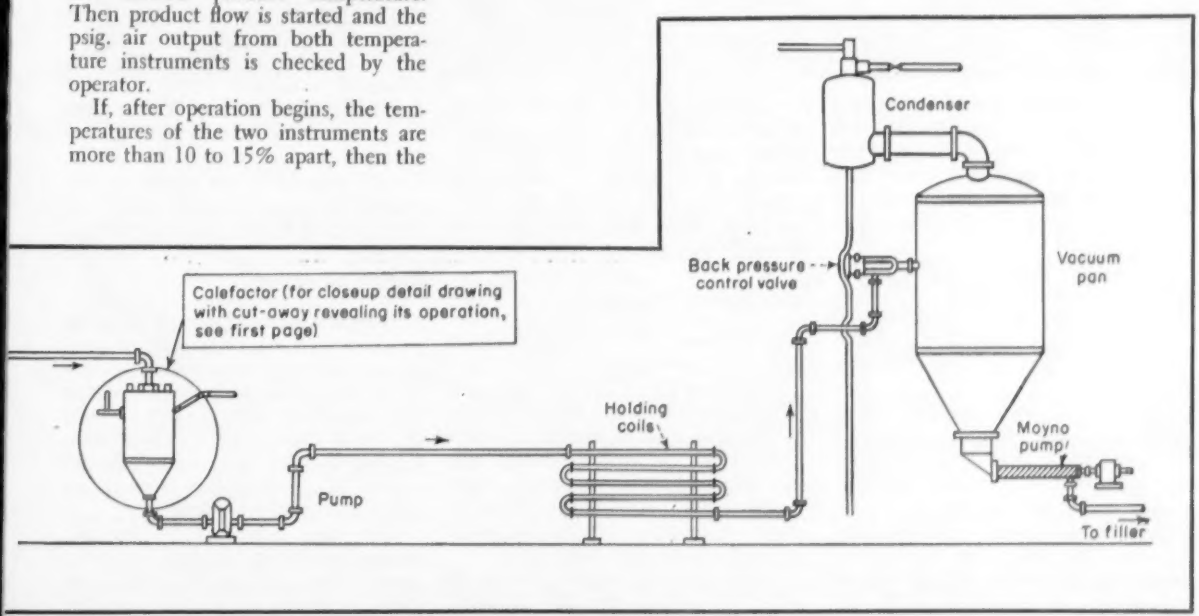
At the discharge of this surface-defroster, each can's lid is removed and an operator punctures the bottom of the can with a sharp air-nozzle. Air pressure is applied, and the frozen core and the small part of defrosted material is blown out of the can. Empty cans are then cleaned by rotating them over a four-bladed squeegee. Cans are conveyed from this station to a point of disposal.

Then the product is passed into a feed-throat leading to the riving machine, and so it is reduced to a frozen slush-like material and discharged into a tank equipped with a heater at its outlet. Via a positive rotary pump, following this point, this material is recirculated back to the tank, until it reaches a temperature of 40F.

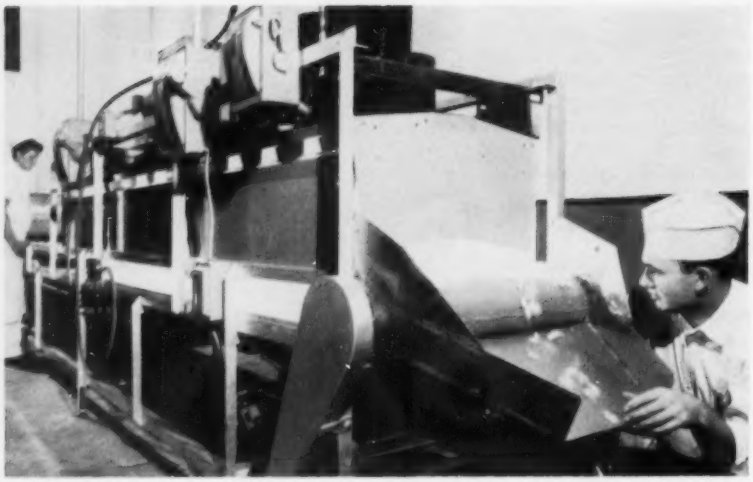
Subsequent flow to formulation tanks is then controlled by the formulation operator. Used alternately are two such tanks in which other ingredients are added to various products.

When formulating a batch, the operator opens a three-way valve, where-

(*Turn to page 176*)



1 **PUFFED MORSELS** move up stainless-mesh inclined belt onto conveyor (rear) going to I-R dryer.



2 **IT TAKES** this high-speed non-stop unit only 2 min. to dry product. Inside are 24 infra-red lamps (1,000w. each). Drying conveyor travels at 5 fpm. And capacity is 150 lb. of product hourly.

Uses I-R for Fast Tasty-Crisping Of Moisture-Sensitive Food

Infra-red lamp battery cuts moisture content of exploded-cornmeal snacks from 13% down to 3 as product is continuously conveyed at 150 lb./hr.

WARREN CARLIN
Sales Engineer, Fostoria Pressed Steel Corp., Chicago

SUCCESS of a brand new snack item—cornmeal exploded into tasty morsels 2½ in. long by ¼ in. dia., and coated with a variety of flavors—is solidly predicated on the fact that this product reaches the consumer in an appetizingly crisp, melt-in-the-mouth condition.

To achieve this, the highly hygroscopic corn product must be rapidly dried from about a 13% moisture content down to 3%, and then packaged so as not to pick up any additional moisture.

For should such content return above 5%, then the morsels would no longer retain their appealing crispness. Instead, they would be undesirably chewy and gummy.

Results have been excellent, using a formula accenting the short drying time. And in terms of high volume production on this item—which was developed by Maize Industries, of Earlville, Ill., and is marketed by franchised processors—benefits are further reflected in shorter conveyorized units occupying less floor space.

Trick of attaining the fast drying lay in installation of a continuous infra-red lamp system. This equipment has the good feature of starting up instantly without requiring any warm-up time. Moreover, temperature or humidity control is no problem.

Way System Operates

It took some time to work it all out and put it into action.

First installation by our organization, Fostoria Pressed Steel Corp., was at Maize Industries' former Chicago plant. Here, a conveyorized oven with two dozen 1,000w. infra-red lamps rapidly speeded the drying and assured close temperature control to avoid product scorching or burning.

Oven conveyor's speed could be varied to expose exploded cornmeal tidbits to lamps' heat for the precise required time, according to moisture content of product. Average exposure time was 120 sec.

This system is now reaping benefits at the Dallas, Tex., plant of Circle D Foods, Inc., where the cornmeal snacks are being dried to 3%-moisture content at a 150-lb.-per-hr. rate.

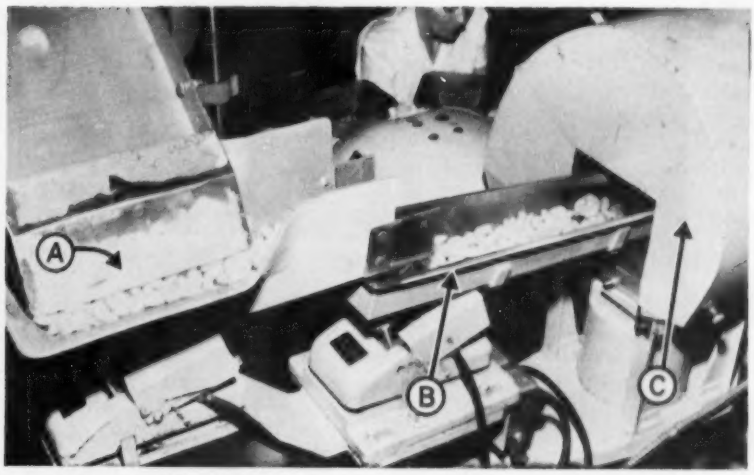
The product is sent down from Maize Industries' Earlville, Ill., plant where, under a patented process, the cornmeal is initially puffed to eight times its original volume. This is done in an extrusion-type exploding machine at a rate of 600 lb. hourly. Packed to a 21-lb. net weight in corrugated shipping cases, the smacks are then shipped to the Circle D plant.

Details at Dallas

Here, the morsels (about 13% moisture) are dumped into a stainless steel hopper holding three cases (63 lb.). From this point, an inclined stainless steel wire-mesh conveyor (24 in. by 4 ft.) feeds the puffed cornmeal onto another stainless wire-mesh belt (24 in. by 22 ft.) traveling through an enclosed tunnel-type dryer.

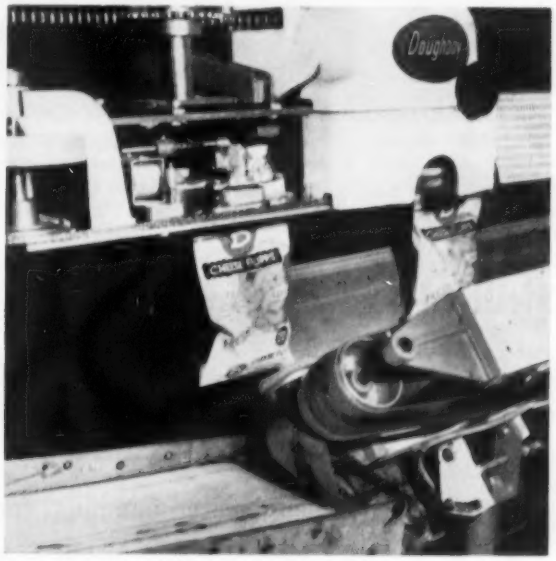
The unit comprises 24 infra-red lamps (1,000w. each). And interior of oven is lined with specular gold surfaces for highly efficient reflection of

3 **ROTATING PAN** puts a cheese-oil coating on dried snacks. Other coatings: Butter, chocolate, caramel.



4 **FROM FEEDING HOPPER,** coated cornmeal tidbits are chuted out (A) and then moved to the right onto a vibrating trough (B). This carries them into net-weigher (C), preparatory to packaging operations.

5 **BAGGING** of accurately-weighed portions of cornmeal snacks proceeds at rate of 35 a minute.



6 **THEN V-BELT** takes bags of flavored morsels—"Cheese Flipps" here—through the heat-sealing unit

infra-red rays from lamps to conveyorized product. We've found that the gold surfaces also re-direct more stray rays to product than do other types of reflecting surface.

A ½-hp. motor-driven exhaust fan pulls moisture out of the oven via a 6x16x24-in. duct and into the room.

Cost for Drying

Speed of the oven conveyor is variable. However, it normally travels at a 5-fpm. rate, with the oven's time cycle set for 2 min.

Belt-conveyed snacks are generally one or two layers deep. And product density runs about 0.25 lb. per sq. ft.

Oven's electrical load is 24 kw. or 24,000w. Electrical energy load costs about $0.02 per kilowatt hour, or a total of $0.48 per hr. to remove 15 lb. of moisture (drying from 13 to 3% moisture content) from 150 lb. of product.

At this rate, cost of driving off each pound of moisture from the product is $0.032. On a pound-per-pound basis, it runs around $0.003.

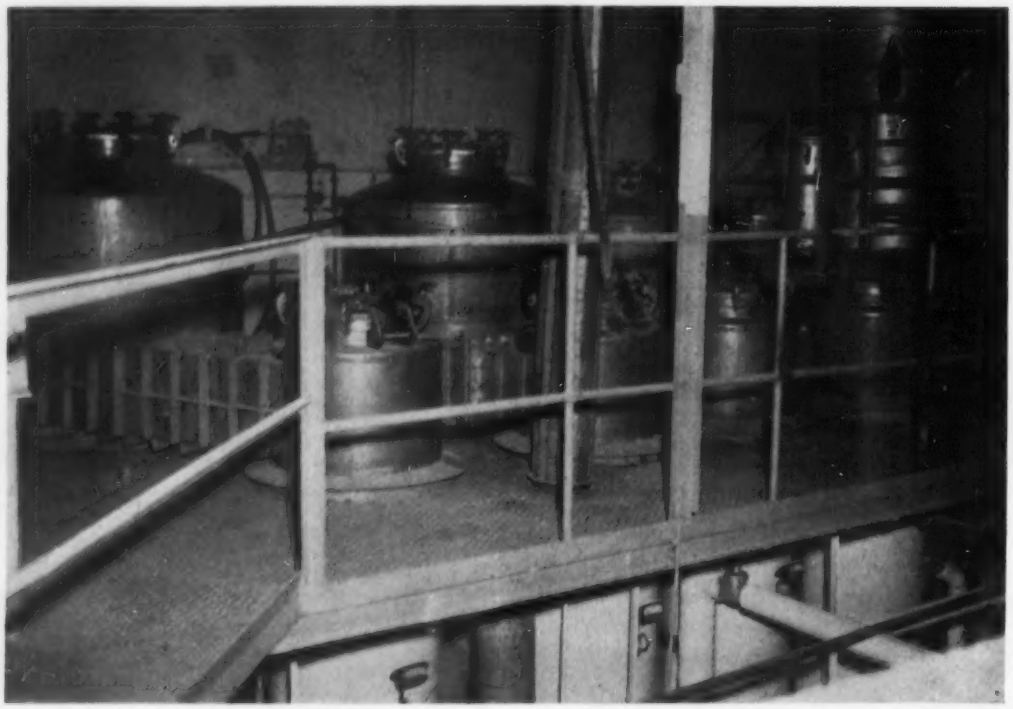
Various Flavors

Dried morsels discharged from the oven are collected into lacquered cans (10-lb. capacity) with snap-on metal covers. They are then flavor coated—with butter, cheese, caramel, chocolate, or the like.

After coating, they are loaded into a hopper that subsequently discharges into a horizontal vibrating chute feeding into the net-weighing section of a packaging machine (Woodman). Here, the tidbits are automatically scaled into bags (1⅛ or 2¼ oz. for 10 or 20¢ bags) at a 35-per-min. rate. Bags are secured below a rotary-type, 8-spout filling unit.

Filled bags are then transferred to a V-shaped belt conveyor traveling through a heat-sealing machine (Doughboy). Bags are finally packed in quantities of 24 (20¢) or 40 (10¢) to a shipping case.

FE SPECIAL REPORT plus foldout flowsheet on pages 106 to 109



KEY ROLE in whey solids process is played by this four-effect evaporator, designed by company engineers. In it, raw material is concentrated to 30% solids. Temperatures range from 212F. down to 132F.

Skillful Processing Broadens Food Uses for—

Modern Whey Solids

Well-engineered handling, concentrating, and drying steps—plus strictest QC—produce stable top-quality dry products

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

WE ARE SEEING new rapid strides in the production of high quality whey solids–and equally-important extensions in the nutritional and functional uses of these products in a variety of foods.

But some tough problems had to be surmounted first.

Initial big stopper was the fact that whey solids, as originally produced, were markedly hygroscopic–quickly picked up moisture when exposed to air. Thus, they became lumpy and finally caked solid.

And so it was impractical to store or ship them–except in expensive, sealed containers. What's more, they were hard to dissolve in water, because they formed sticky lumps.

These difficulties stemmed from the fact that about three-quarters of the solids product consisted of lactose (milk sugar) in the anhydrous state–an unstable compound when exposed to moisture.

Making It Free-Flowing

Researchers at Western Condensing Co., Appleton, Wis., played a part in the removal of these stumbling blocks. Early, they recognized that what the product needed was a stabilized form of lactose (lactose monohydrate, wherein a molecule of water is joined to each molecule of sugar).

Of course, this result could be arranged by letting the powder absorb enough moisture to convert it to a solid cake, then pulverizing this block into a stable powder. But such a process is costly because of the equipment involved. Also, this uncontrolled method produces an inferior product.

However, they finally hit upon the trick of converting lactose to its monohydrate form by crystallizing the sugar in condensed whey. Product is then dried in such a manner that grinding is eliminated.

Result: A stabilized, free-flowing powder that is readily stored, shipped, and dissolved. Moreover, most of its proteins (largely lactalbumin, together with a small amount of lactoglobulin) are now in a non-coagulated form.

Sanitation as well as efficiency have

been engineered into the new condensing process. Liquid whey is pumped directly from the cheese factory to the adjacent concentrating plant (or to a tank truck) through C.I.P. (clean-in-place) glass lines.

At the Appleton plant, advanced dairy-type processing equipment is employed. Many units were designed and fabricated in the company's machine shop. Sanitary pumps, pipes, and fittings are used throughout, and laboratory control checks are constantly made at key processing steps.

As for capacity, the plant is geared to turn out 30,000 to 40,000 lb. of whey solids daily. In addition to a pure lactose, five different whey products are manufactured: 1. Coarse non-dusting solids of 60-80 mesh; 2. fine solids, 200-mesh; 3. a group of modified whey products, consisting of varying proportions of fine whey solids, non-fat dry milk, and refined soya solids; 4. blends of fine whey solids and non-fat dry milk; and 5. a spray-dried whipping agent derived from whey and specially processed to boost its natural whipping properties.

Once It Was "Just Hauled Away." But No Longer!

Yes, liquid whey, in earlier days, was considered as mere waste matter having virtually no commercial value. In fact, some cheese processors even paid just to have it hauled away.

But today it's a No. 1 byproduct—extensively used in both human and animal foods.

To make this transition, enterprising men had to improve liquid-whey handling methods and invent special drying techniques for centralized operations—because the 1,200 or more Wisconsin cheese factories can't economically dry their own whey.

So now the liquid is transported to a few large drying plants, like the one established at Appleton by Western Condensing Co.

To meet the rigid quality standards and curb possible bacterial spoilage, two striking innovations in transport have been devised:

1. Liquid whey produced within a 35-mile radius of the main drying plant is pre-chilled to 36-38F. and brought in daily in insulated stainless-steel tank trucks (38,000 lb. capacity).

2. That produced at greater distances is first pre-concentrated to 35-40% solids in feeder plants that have been built adjacent to the cheese factories. Then tank trucks move this partly-finished product to the main processing plant.

Handling the Whey

Step-by-step processing details:

First, liquid whey from the cheese plant is run through a centrifuge to remove residual fat. Raw whey (6.5 to 6.8% solids) contains about 0.5% fat. Resultant material is then pasteurized and either chilled to 36-38F. for direct trucking to the Appleton plant, or is condensed in an adjacent plant to 35-40% solids, then shipped.

On arrival at Appleton, insulated, stainless steel milk trucks (the company owns 45) are first weighed. Before unloading, temperature of whey is recorded, and the QC-lab tests for sediment and titratable acidity.

If acidity is above 0.16% (expressed as lactic), whey is processed into animal feed in a separate drying plant. High-quality whey is pumped through a sanitary pipe (3-in. dia.) to insulated stainless-steel milk-storage tanks (50,000-lb. capacity). Unloading takes a mere 15 min.

From the storage tank, the liquid product is pumped through a pair of horizontal, tubular pre-heaters. Here, temperature is raised to 160F. in the first unit, 220F. in the second.

Condensing Whey

Whey continues at a 20,000-lb./hr. rate through an up-blast four-effect evaporator, specially designed by company engineers. Entering 1st effect at about 6.5% solids, whey discharges from the 4th effect at 28-30% solids.

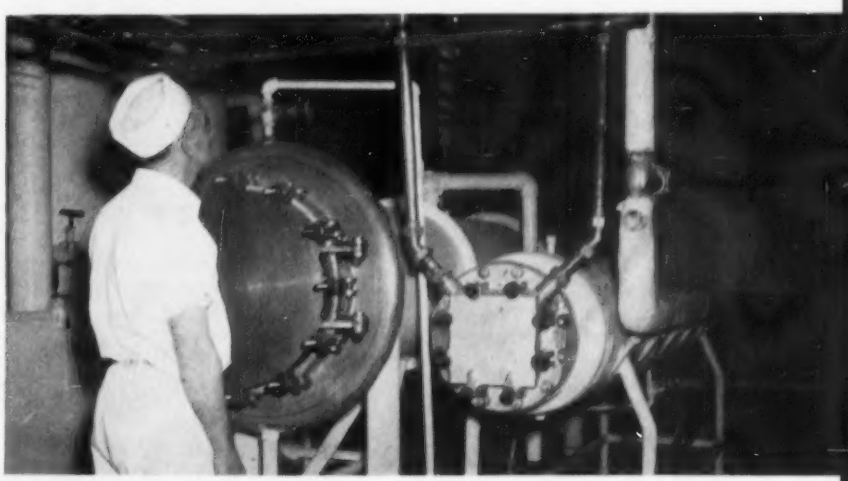
Temperatures are about 212F. in 1st stage, 190F. in 2nd, 176F. in the 3rd, and 132F. in the 4th. Condensed whey subsequently goes into storage tanks—ready (along with condensed raw material trucked in from feeder plants) for final concentration.

Pumped through a vertical, tubular-type heat-exchanger, condensed whey is raised to 190F. It then proceeds through another company-built evaporator (single effect) at a 50,000-lb./hr. rate. Here it attains final solids content of 50%.

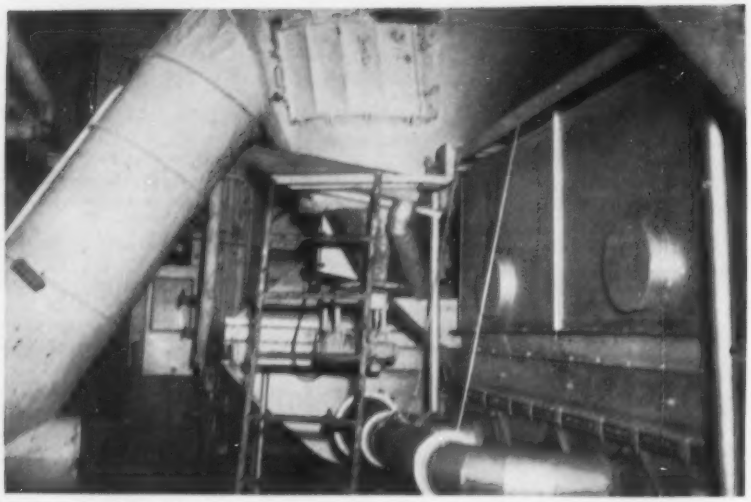
Stabilization process starts when fully-condensed whey is deposited in agitator-equipped cooling tanks. Well water trickles from perforated pipes down the outside of these units. This cools the whey and accelerates lactose crystallization.

Nearly-finished product is then pumped to a spray dryer, where stabilization of lactose is completed as product is dried to about 15% moisture. A high-speed, centrifugal-type atomizer is used. Its design prevents clogging from lactose crystals as whey is finely dispersed in the drying unit. Stabilized powder drops into a hopper that continuously feeds product to a hot air-heated vibrating dryer. Powder

STAINLESS TANKERS whisk raw and pre-concentrated wheys from cheese plants to main processing center. Pump-equipped hose line transfers contents in minutes.



DUAL HEAT EXCHANGER boosts whey temperature from about 38F. to 220F. before liquid enters concentrator. Here, flow rate is 20,000 lb.-per-hr.



FINAL STABILIZATION of whey solids takes place in spray dryer (center). It also dries product to 15% moisture. Vibrating hot-air dryer (right) completes job, reducing product to 4-5% moisture.

emerges with a 4-5% moisture content.

Any soft lumps are broken up by impact as solids drop into a fan and are blown to a cyclone. Product then drops to a sifting screen (Rotex). From here, it proceeds either as coarse (60- to 80-mesh size) whey solids to a bagging and drum-packing station, or it goes to a pulverizer (Schutz-O'Neill).

Pulverized whey solids (200-mesh size) can be bagged or sent to a horizontal ribbon-type mixer. In the latter, whey is blended with non-fat dry milk and/or refined soya solids to produce modified whey solids. Polyethylene-lined bags and drums are used for all products.

To make the whipping agent, raw whey is specially treated in milk-storage tanks to increase its whipping properties. From here on, process is similar to making regular whey solids.

Ingredient Uses Mounting

Built-in advantages boom uses of these products in dairy, bakery, confectionery, soup, and meat goods

Now, to a quick rundown on how these whey solids are used in various foods:

▶ **Cheese Foods and Spreads:** Whey and non-fat dry milk are now commonly used in both of these products. For they furnish valuable nutrients, also restore some important milk solids lost in cheese-making. The whey product (tradenamed Sweet Dairy Whey by Western Condensing) is an inexpensive form of milk solids, and reportedly it aids in giving soft-body characteristics to cheese foods and spreads.

Because spreads have a high moisture content (44-60%), high concentrations of whey solids can be used without developing "sandiness" from crystallization of lactose. In contrast, cheese foods (limited to 44% moisture) use smaller amounts.

But total lactose content in either cheese foods or spreads must not exceed the saturation point of this milk sugar at about 60F., or "sandiness" will occur. As a guide, about ¾ lb. of whey solids contains as much lactose as 1 lb. of non-fat milk solids.

In addition, dry whey adds a pleasant and distinctive flavor of its own, accentuates cheese flavors, and maintains tastes of other optional spread ingredients—like meats, fruits, chives, and pimentos.

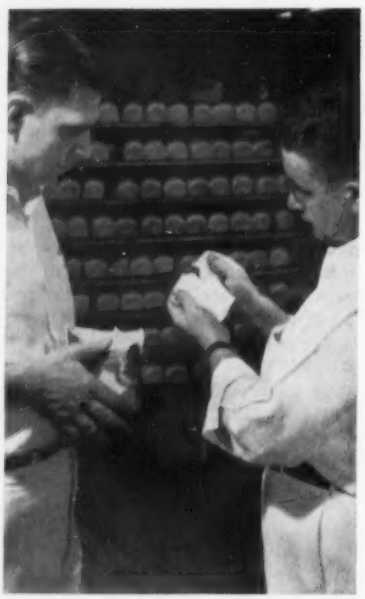
▶ **Fermented, Baked Products:** Non-fat whey solids and a modified whey material containing dried whey, non-fat dry milk, and refined soya solids (Dairy-Bake) also benefit the baker. High lactose content contributes to flavor, nutrition, and crumb structure. The high amount of lactalbumin supports crumb structure, too. Low casein content minimizes toughening of baked foods.

Suggested formulas (based on 100 lb. flour) using modified whey (MW) in yeast-fermented doughs are as follows:

For bread—Water, 60-66 lb.; yeast, 2 lb.; salt, 2 lb.; sugar, 6-8 lb.; shortening, 3-6 lb.; MW, 3-6 lb.; plus optional ingredients.

For soft rolls—Water, 62-66 lb.; yeast, 1¾-2¾ lb.; salt, 1¾-2 lb.; sugar, 6-8 lb.; shortening, 6-8 lb.; MW, 3-6 lb.; and malt, 1-2 lb.

Coffee Cake — Water, 45-75 lb.; yeast, 6-10 lb.; salt, ¾-1 lb.; sugar, 15-25 lb.; shortening, 15-20 lb.; MW, 6-8 lb.; malt, 0-2 lb.; mace 0.025 lb.



WHEY SOLIDS IN BREAD impart a shortness of crust and add attractive bloom and golden brown color. The ingredient's high lactose and balanced protein content reduce baked goods shrinkage and extend shelf-life.

Danish pastry—Water, 45-55 lb.; yeast, 6-10 lb.; salt, 1 lb.; sugar, 10-15 lb.; shortening, 10-15 lb.; MW, 6-8 lb.; malt, 0-2 lb.; and mace, 0.025 lb.

Non-fat whey solids can be used in place of modified whey products at the same levels. However, due to higher percentage of lactose in the non-fat product, it is necessary to

slightly reduce moisture content of the dough. Quality and economy contributed by this ingredient will offset the necessity of adjusting formulas.

▶**Cookies, Crackers, Coatings, and Fillings:** In general, whey solids are used in cookies in the same manner as are other dairy ingredients, like whole milk, buttermilk, and non-fat dry milk.

Benefit-wise, the product reportedly . . .

1. Contributes to flavor, by intensifying, rather than masking, tastes. In high-fat (vegetable) coatings and fillings, it boosts "dairy" flavor, offsetting bland oils or shortenings.

2. Adds to color and bloom. High lactose in whey accentuates over-all color and "brightness" of cookies or crackers. Baked color of whey solids tends to golden brown. Oven-temperature variations have slight effect, if any, on color changes when the whey is used at higher levels.

3. Improves cookies, coatings, and fillings (without undue formula rebalance), because of its functional properties. The whey product is rated as a neutral-to-slightly-tenderizing cookie ingredient. It maintains viscosity of doughs, batters, and coatings without formula adjustments. Thus, it aids machining and depositing of these goods. In fillings or coatings even high percentages of whey solids do not "tie-up" any of the shortening.

4. Lowers cost of making cookies. Said to give 25-50% savings compared with non-fat dry milk.

Recommendations for using whey solids are based on experience of cookie and cracker manufacturers and laboratory studies. They reveal that the product can be a direct replacement for other types of milk solids, or at higher percentage levels. When incorporated at 3 to 4% levels, its slight tenderizing action does not affect cookie-formula balance. And product can be added in the dry form.

Recommended percentages of whey solids (based on total flour) are 2-4% for sheeter and rotary cookies, and 3-6% for bar-press and wire-cut cookies. For crackers, add 1 to 3%, and 3 to 15% for fillings (sandwich, fudge, cheese, etc.). Coatings use 3 to 6%.

▶**Candies (Caramel, Fudge, and Taffy):** When used in confections, whey solids (fine) accentuate added flavors. However, lactose produces a dark color easily. Thus, cooking must be carried out at lower temperatures or under vacuum.

Too, whey solids extend shelf-life of candies. Lactose prevents complete crystallization, thus stops "graining out." It also acts as a humectant and thereby maintains proper moisture level.

Usually, ¼ to ½ of the non-fat milk solids in condensed milks—used for caramel, fudge, or taffy—can be replaced with whey solids. For firm caramels, it may constitute 30-40% of the non-fat dairy solids. Higher amounts are recommended for softer caramels.

Suggested by Southern Regional Laboratories is this procedure for making caramels with the product. Thoroughly mix 28 lb. of sweetened condensed milk, 10 lb. of whey solids, and 5 lb. of water to make a smooth paste. Heat 10 lb. of sugar, 22½ lb. of corn syrup (43 Baumé), 6½ lb. of invert sugar, 5 lb. of vegetable fat, and 2 lb. of water until sugar dissolves. Add whey-condensed milk paste slowly. Cook to firm ball, add flavor, pour on oiled slab, cool, and cut.

▶**Frozen Ices, Sherbets, and Ice Cream:** According to experiments made by the Bureau of Dairy Industry (at U. of Missouri and U. of Minnesota), whey solids have definite advantages over non-fat milk solids in making sherbets and ice cream. They replace up to ½ of milk serum solids in ice cream. Sherbets usually contain about 5%.

In these frozen desserts, the product enhances fruit flavors, smooths body and texture, requires less acid to reach desired pH (in sherbet mixes), improves protein stability (since whey protein is not precipitated by addition of citric acid to mixing tank ahead of freezer), lowers ingredient costs, and improves whipping properties.

Best way to add these solids to a mix is to blend them with the dry sugars and stabilizer. Then slowly add blend along with water (stirring). Finally, mixes are pasteurized at 165F. for 30 min., homogenized at 2,500 psi., and cooled.

Sherbet mixes containing gelatin, and all ice cream mixes, must be aged about 4 hr. at 40F. prior to freezing and packaging. Sherbet mixes having pectin, however, need not be aged after cooling.

Occasionally, excessive overrun is obtained in whey-based sherbets made in batch freezers. But this can be checked by adding 0.6% or more of fat in the form of 20-40% cream.

Whey solids are also used to advantage in the manufacture of soups and comminuted meat products.

The non-fat product is covered by a U. S. Standard. And products meeting this grade are designated "U. S. Extra." In testing for this rating, 6.5g. of dry whey are added to 100 ml. of water. Using this sample, product must fulfill the following requirements:

1. Alkalinity of ash—not more than 225 ml. of 0.1 N. HCl per 100g.
2. Bacterial estimate—not more than 50,000 per g.
3. Butterfat content—not more than 1.25%.
4. Moisture content—not more than 5.0%.
5. Scorched particle content—not more than 15.0 mg.
6. Solubility index—not more than 1.25 ml.
7. Titratable acidity—not more than 0.16%.

The whipping agent (Western Condensing's Dairy-Whip), like gelatin or egg albumen, does not whip in the presence of fat. It is very soluble, and needs no preliminary soaking.

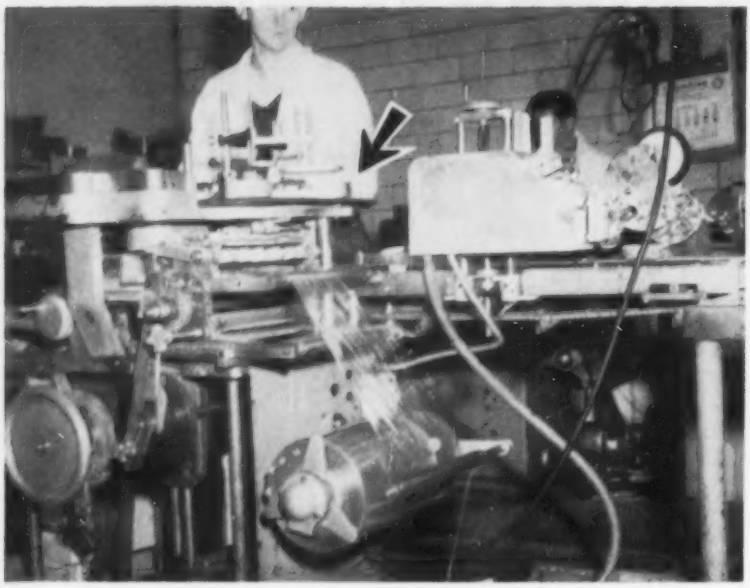
Product is used to advantage in manufacture of marshmallow cremes and toppings, nouget, and other aerated confections. When used with other whipping agents, it can be mixed with them before adding to the formula.

In angel food cakes, this agent provides extra tenderness and greater moisture retention. It replaces 10-15% of the egg white solids in the formula.

Marshmallow cookie toppings have an appealing shortness and more tenderness when 20-30% of the gelatin is replaced with this whipping product. It can also be used in making frappe, mazetta, and cast marshmallows.

Here's What Whey Products Contain, Percentagewise

Constituents	Whey Solids (U. S. Extra Grade)	Blend of Whey Solids, Non-Fat Dry Milk and Refined Soya Meal	Blend of Whey and Non-Fat Dry Milk
Lactose	72	56	62
Lactalbumin protein	12	8	10
Casein protein	...	9	13
Cereal protein	...	8	...
Other carbohydrates	...	5	...
Minerals	11	8	10
Moisture	4	4	4



TWIN-PACK DIES (arrow) are installed on packager. They handle two stacks of cold cuts, which are wrapped side-by-side as a single unit. Plans call for installation of supplementary hot-air jets for further shrinking package sides. These jets would go at right of coder (center).

Solved: Packer's Film-Feed Problem

Pull—instead of push—principle adapts luncheon-meat wrapper for Saran film. Feed belts, reciprocating heaters further boost efficiency

FE STAFF

How do you turn packaging material problems to advantages? The answer is pinpointed in the modern luncheon-meat line at New England Provision Co., Boston.

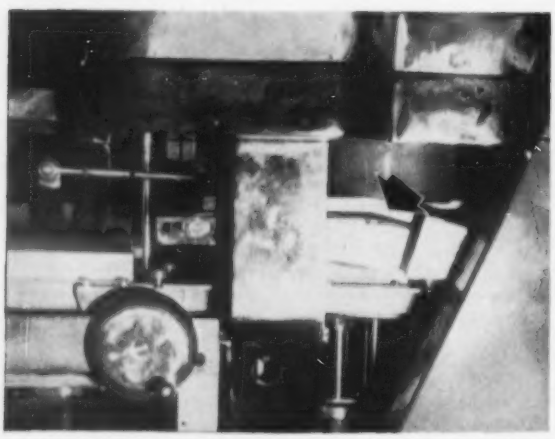
Here, prime need was a film giving a tight package, high product visibility, crisp appearance, and fast wrapping speeds. To fill this bill, the company has turned to Saran (Dow Chemical Co.).

Nepco's distribution covers a relatively small area—50 miles in and around Boston—and the company services its accounts two to three times per week. Thus, the 8- to 10-day shelf-life afforded by this film is more than adequate.

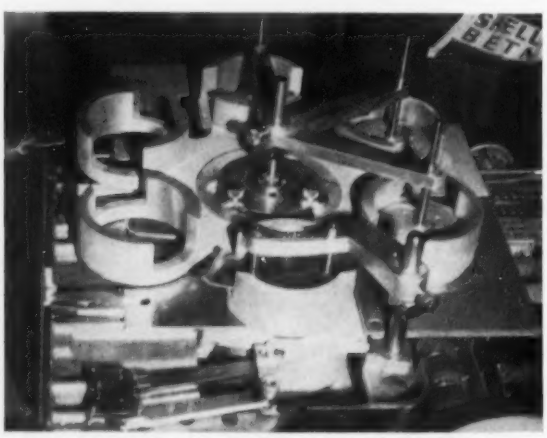
True, this material can be a bit difficult to handle and seal—but these problems have been solved by an ingenious packager (Wrap-King Corp.) that literally makes Saran's peculiarities work to its advantage.

Nepco now packages 14 varieties of luncheon meats in the film. Its modern wrapping line, handling 6- and 8-oz. sizes, averages 50 packages per minute (top wrapper rating: 80/min.). And daily production (8 hr.) runs be-

(*Turn to page 94*)



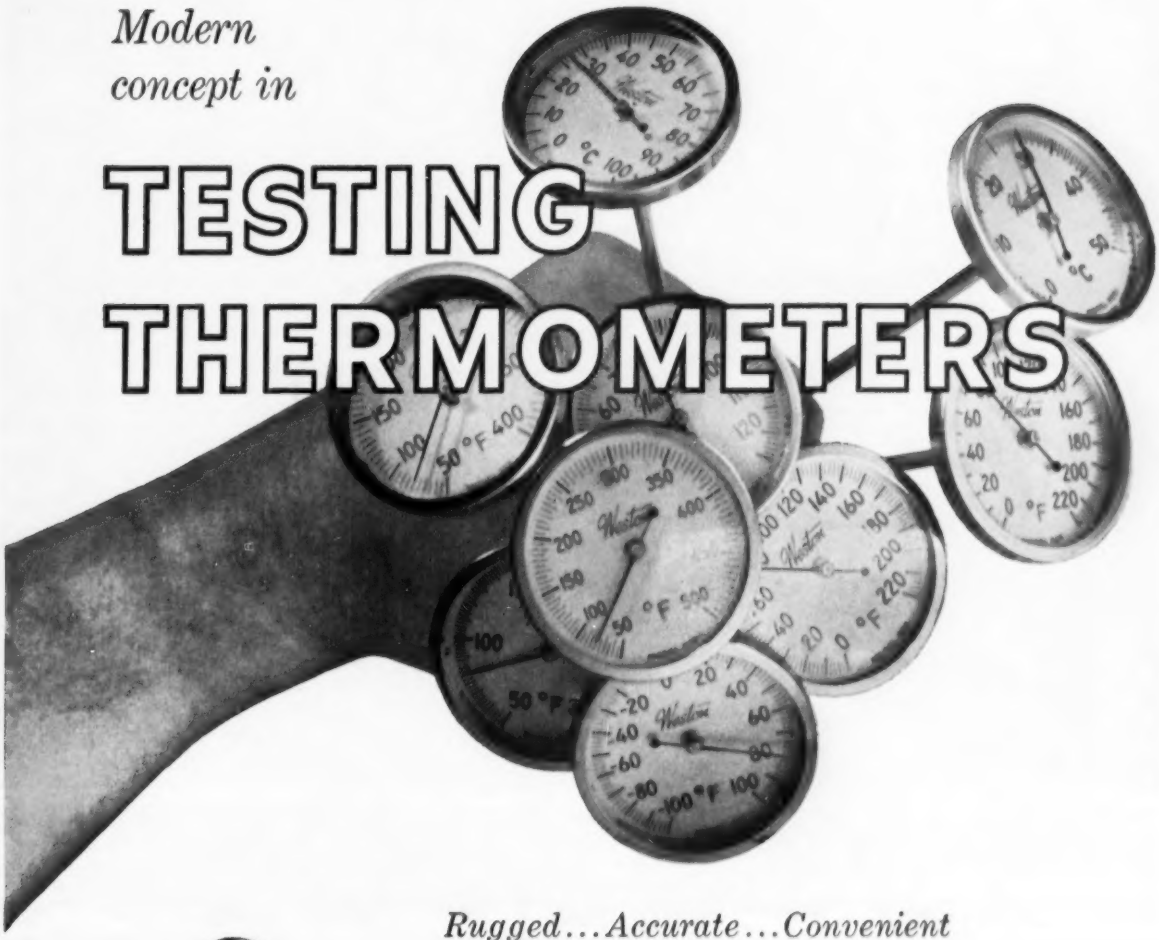
POWER-DRIVEN BELTS (one seen at arrow) support and pull Saran film into wrapper. This eliminates push-type film feed. Film's static charge helps hold it to belts.



ROTARY HEAD has reciprocating heat sealers that avoid scuffing of folded flaps. Note one-piece head die (here set for round cuts) that speeds changeover.

Modern concept in

TESTING THERMOMETERS



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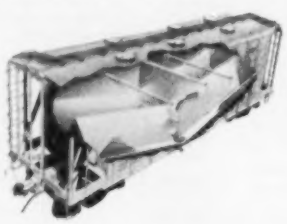

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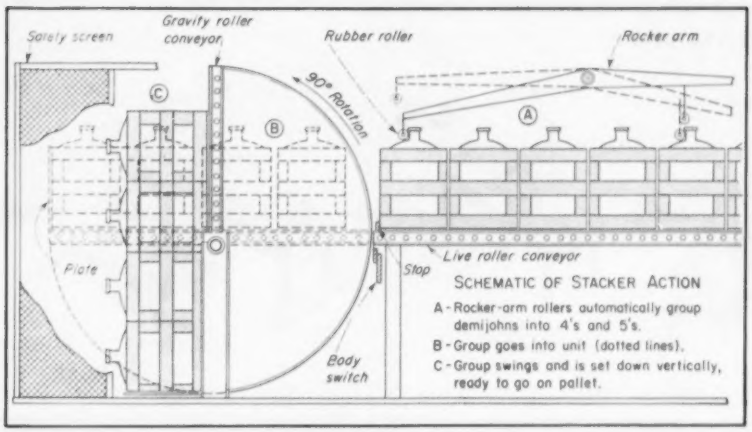

Safety screen
Gravity roller conveyor
Rubber roller
Rocker arm
90° Rotation
Plate
Stop
Live roller conveyor
Body switch
SCHEMATIC OF STACKER ACTION
A - Rocker-arm rollers automatically group demijohns into 4's and 5's.
B - Group goes into unit (dotted lines).
C - Group swings and is set down vertically, ready to go on pallet.

FOUR DEMIJOHNS start gentle swing inside stacker. When they reach vertical, operator will hand-truck them to pallet, after nudging body-switch (arrow) to repeat stacker's cycle.

BIG Savings In Handling BIG Bottles

New stacker slashes man-hours, palletizing trims $70,000 off annual bill, trailer payloads are up 27%, and costly breakage is curbed

R. I. HILL
Production Manager, Arrowhead & Puritas Waters, Inc., Los Angeles

It was a tedious manual chore of moving and truck-loading empty and filled 5-gal. glass demijohn bottles that had run up the major portion of materials-handling costs at Arrowhead & Puritas Waters, Inc., Los Angeles.

What's more, bottle breakage was a serious item, since these demijohns cost in the neighborhood of $1.25 each.

• Today, however, A-P is jotting considerable savings in its ledger—due to the fact that it has gradually developed greatly improved handling methods. Special mechanical stacking and lift-trucks and pallets have replaced the old manual stacking and loading.

Some of the earlier moves, made in cooperation with McKinsey & Co., business engineering firm, provided an excellent start on the changes. Then all-out palletizing brought a solid cost reduction of approximately $70,000 annually. And the use of new light-weight trailers (Fruehauf) lifted payloads about 27%. Then man-hours come down in a hurry.

For facile safe stacking of the bottles of spring and distilled water, the company devised its automatic demijohn-stacker. This unit operates semi-automatically, stacking crated bottles four or five high at a line capacity of 1,000 bottles an hour—and with practically no breakage.

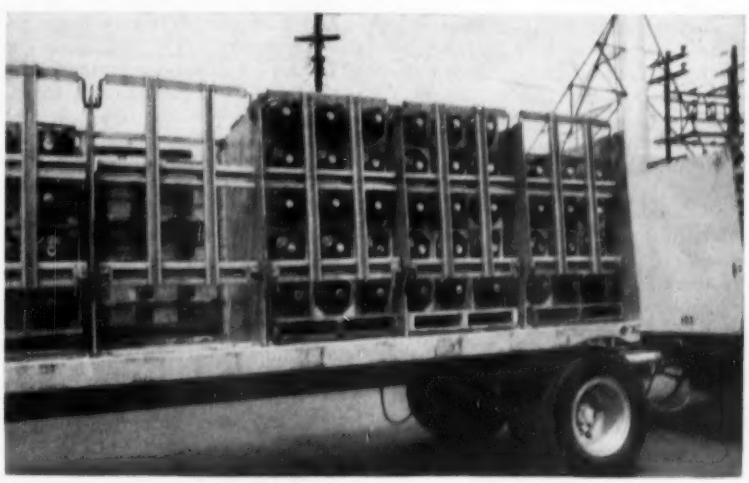
Closeup of Stacker

The stacking unit is comprised of a gravity roller conveyor fixed at its center to an axle. At the far end of the conveyor is a plate which stops the flow of bottles, while also providing a base to hold them when in vertical position.

A motor provides power to rotate the conveyor in a 90-deg. arc. When shut-off or just beginning operation

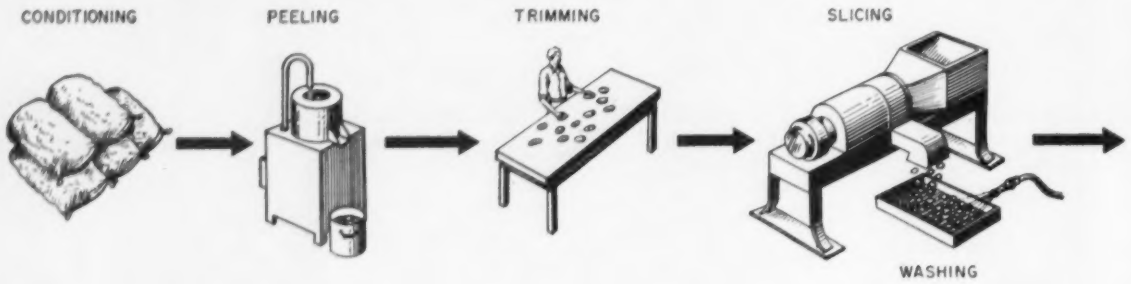
(Turn to page 87)

LIFT-TRUCK takes pallet-loads direct to trailer-trucks or storage. Note spring-loaded rubber-faced hydraulic clamp (arrow) that safely holds load.



COMPARTMENTS of trucks and trailers feature gates that firmly hold the bottles in either 4- or 5-high stack pallet-loads, 3 wide.

PICTURE BRIEF OF ADVANCED TECHNIQUE



Mashed Potato Flakes

Ease of reconstitution, fine flavor and color, texture comparable to fresh mashed potatoes characterize new product. Process handles eastern low-solids tubers as easily as western high-solids ones

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

SO NEW that they're just now undergoing their first market tests—yet proved superior to other dehydrated mashed potatoes by extended lab and pilot tests.

That's the story of the new mashed potato flakes recently developed at Eastern Utilization Research Branch, USDA, Philadelphia.

They're made by a process that doesn't require specially built equipment, nor the recirculation of partially dried product. And so this method is hailed for its advantages over previous techniques.

Highlighted are the following—

- Either low or high solids potatoes can be used. Previously, only the high-solids tubers gave a satisfactory product.
- Drying to 4% moisture content, or less, is accomplished in a single operation, and in less than ½ min. This minimizes development of off-flavors and colors due to long holding, or prolonged heating.
- Process employs readily available and commonly used equipment, and only a minimum of labor is required.

In order to successfully produce dehydrated mashed potatoes that can be rehydrated to the texture and appearance of the fresh product, these two main requirements must be met—

First, the potato cells must be put into a form that will permit the rehydrating liquid to penetrate quickly.

Second, the starch must be retained in the cells. Cell rupture, both during manufacture and on reconstitution, must be kept to a minimum so free starch liberated will not cause the reconstituted product to become pasty.

The new process meets these requirements by: (1) Precooking at 165 F. for 15 min. prior to final cooking at 212 F.; (2) avoiding damage by cooking for minimum time, and by ricing instead of mashing, and (3) careful control of conditions on the dryer to produce a flake of desired density and thickness.

Processing Details

As operated at EURB, potatoes are scalded at 140F. in 22% lye for 4 min., then enter a rod washer equipped with high pressure water sprays that remove the skins. This is followed by hand trimming to remove eyes and traces of peel not washed away by the sprays. The low-temperature peeling serves to avoid surface cooking of the potatoes.

Slicing to ⅜-in. thick slabs is done in a conventional unit employing water sprays to remove surplus starch. Then slices are precooked in a water bath. It is this step that permits use of lower solids content potatoes.

After this treatment they are no longer crisp, but are tough, resilient, and somewhat translucent. Starch in the cells is completely gelatinized.

Slices are then cooked by conveying through a steam cooker—20 min. at 212F.—and riced through a unit with ¼-in.-dia. holes.

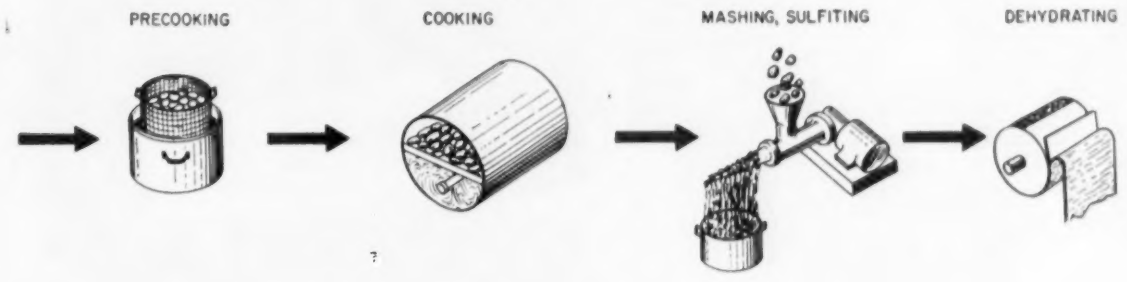
At this point, additives—sulfite and antioxidant—are incorporated to protect the color and flavor of the potatoes during drying. A sulfite solution containing 2.5% $NaHSO_3$ and 7.5% Na_2SO_3 by weight is added at the rate of 0.79 cc. per lb. of mash. (This results in a level of 400 ppm. SO_2 in the mash, and not more than 200 ppm. in the flakes.)

An antioxidant (Tenox VI, Eastman Chemical Co.) is made into a stock solution containing 24.7g. per liter of water. This is added at the rate of 3 cc. per lb. of mash—the equivalent of 0.0075% BHA in the product.

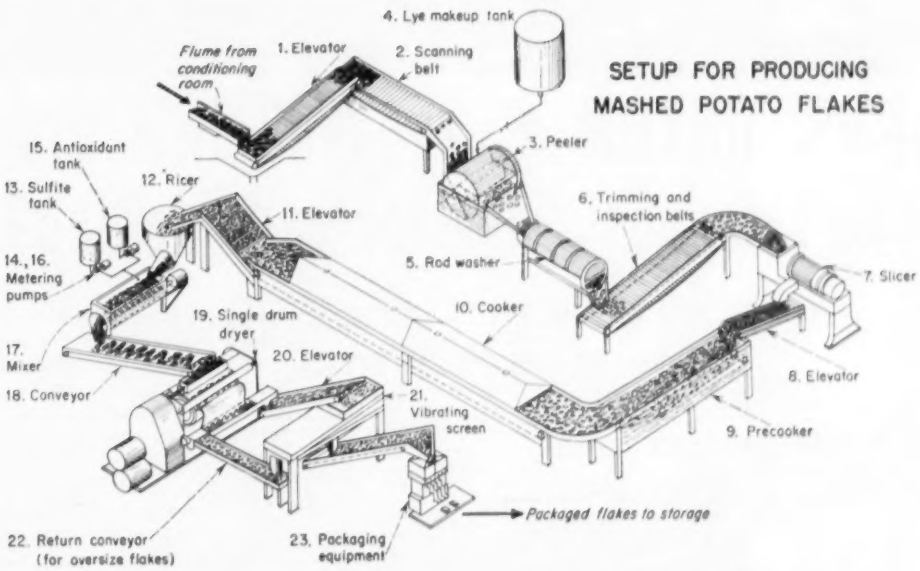
Drying is with a single-drum unit of the type employed in making potato flour. Drum is operated at about 2 rpm., using 100 psi. steam. Experience has shown that a fine-grain cast-iron drum can be used with steel applicator rolls. It may be desirable, however, to chrome-plate the applicators, since the wet mash remains on them for a longer period and may pick up bits of iron.

The dried sheet can be scored or broken by passing between two rolls operating at the same surface speed as

(Turn to page 84)



By Low-Cost Process

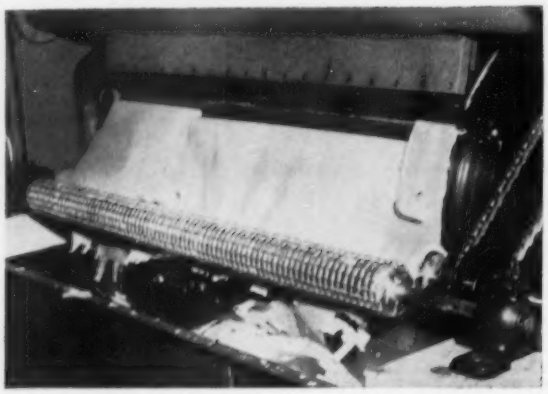


Cost of Equipment for Producing 15,000 Lb. Flakes Per Day

Units	Cost
1. Elevator to transfer 4,528 lb. potatoes per hr. from flume to scanning belt. All steel slats on steel chain	$2,500
2. Scanning Belt. Slow speed with side rails	1,030
3. Lye Peeler. Rotary type with variable speed drive, external heater	3,850
4. Lye Makeup Tank. Steel with dished head, jacket, agitator, transfer pump	740
5. Washer. Rotary type rod with spray heads and water at 60 gpm., 175 psig	3,790
5. Trimming and Inspection Belts. (4)	3,880
7. Slicer	1,750
8. Elevator. Rubber belt with cleats and side rails	1,410
9. Precooker. Wood tank with aluminum lining. Provided with stainless wire mesh belt and elevator. Heated with live steam automatically controlled to maintain 155F. temperature	5,600
10. Cooker. Galvanized iron shell with fabric seals at open ends. Stainless mesh belt extending beyond shell for feed and discharge. Operates in live steam with 20-min. hold	11,600
11. Elevator. Rubber belt with cleats and side rails	1,920
12. Ricer	2,920
13. Sulfite Tank. Stainless (316) with hand hole in cover	240
14. Metering Pump. To deliver 0.56 gph	490
15. Antioxidant Tank. Carbon steel with agitator	$280
16. Metering pump. To deliver 0.87 gph	490
17. Mixer. Stainless pug mill with conveying and breaker blades	3,350
18. Conveyor. Rubber belt with cleats	1,390
19. Single Drum Dryers (2). 4-ft. dia. 10-ft. long, with auxiliary rolls, variable-speed drive, discharge breaker	43,500
20. Elevator. Rubber cleated belt	1,620
21. Vibrating Screen. Two-mesh, single deck wholly enclosed. Stainless screen and contact parts	1,620
22. Small Conveyor. Returns oversize flakes to process	910
23. Packaging Equipment	
Aluminum bins (2) above packaging machine. (Each to hold ½-hr. supply)	500
Packaging Machine. Tri-laminate bag-making, filling, sealing machine	19,000
Conveyors (3)	3,230
Carton sealer	5,000
Also River Water Pump (to provide water to flume). Centrifugal, 125 gpm., 50-ft. head	1,590
TOTAL	$124,200

Drying to 4% Moisture is Accomplished in a Single Operation

MASHED POTATOES, fed to top of drum, are formed in thin layer by first applicator roll. Three remaining rolls, kept covered with mash, build up dense sheet.



AS SHEET discharges from dryer, wire covered roll (foreground) scores it, then screw in trough (above) breaks it into flakes for packaging. (USDA photos.)

the drum. One roll should be of soft rubber, and the other should be metal, reticulated to break the sheet into pieces about ½-in. square. Further breaking will result if blades of the discharge screw are serrated.

The sheet should be broken into pieces small enough to keep bulk low, yet large enough to avoid excessive cell rupture. A good compromise is a size that will just pass a 2-mesh screen. Bulk density of the product not com-

TABLE I—CAPITAL COSTS For 15,000 lb. Per Day Plant

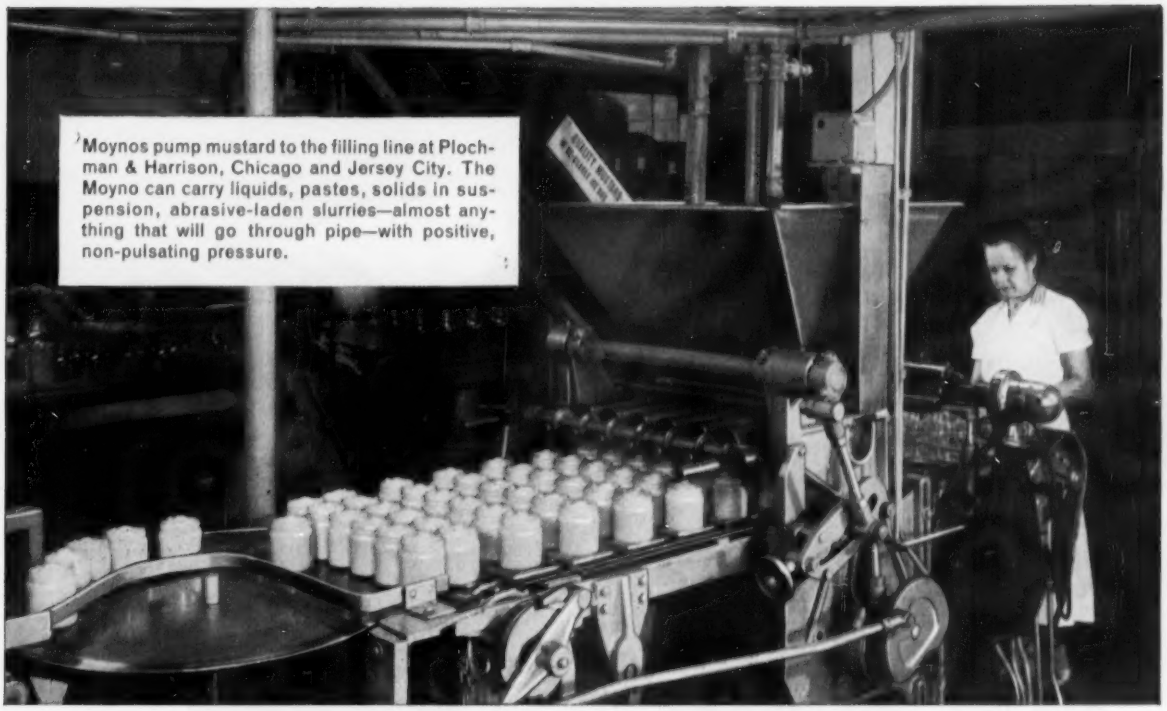
Item	Cost
Equipment	$124,200
Equipment erection	40,800
Instrumentation	1,300
Pipe & ductwork, materials	19,300
Piping & ductwork, erection	13,500
Power, installed	4,700
Insulation	300
Freight on equipment	2,500
Contingencies	29,100
Engineering fees	43,000
Contractors' fees	11,600
Total fixed capital	290,900
Working capital	328,500
Total capital	$619,400

TABLE II—OPERATING COST SHEET

	Cost Per Day	Cost Per Lb.
I. Prime cost		
Materials		
108,672 lb. potatoes, 18.5% solids, at $1.1375/100 lb.	$1,236.14	$0.0816
Other	105.30	0.0069
Total	$1,341.44	$0.0885
Labor cost	697.60	0.0460
Total	$2,039.04	$0.1345
II. Materials		
Tri-laminate for bags	795.86	
Cartons for bags	620.89	
Shipping cases	200.29	
Glue and supplies	5.00	
Total	$1,622.04	$0.1070
III. Factory overhead		
Indirect labor		
Supervision	73.00	
Indirect Labor (continued)		
Watchmen, yardmen	13.14	
Mechanics, etc.	32.00	
Office help	24.70	
Truck operator	3.33	
Total	$146.17	$0.0096
Indirect Expense		
Fixed		
Insurance, public liability and fire	14.54	
Taxes	29.09	
Interest on fixed capital	72.72	
Depreciation	145.45	
Total	$261.80	$0.0173
Non-wage payments		
Social security	12.32	
Workmen's compensation	9.82	
Unemployment insurance	48.09	
Total	$70.23	$0.0046
Utilities		
Process power	32.11	
Process steam	105.57	
Process water	13.43	
Total	$151.11	$0.0099
Miscellaneous		
Process maintenance, repairs, and renewals	87.27	
Gasoline	3.90	
Factory supplies	13.09	
Waste disposal	33.25	
Miscellaneous factory expense	10.00	
Rent, conditioning building	25.50	
Rent, processing building	93.64	
Rent, boilers	21.92	
Rent, miscellaneous	6.90	
Total miscellaneous	$295.47	$0.0195
Total indirect expense	629.31	0.0414
IV. Total factory overhead	$924.78	$0.0609
V. Factory cost	4585.86	0.3024
VI. Interest on working capital	67.51	
VII. Research & development expense	128.84	
VIII. Administration & general expense	130.64	
IX. Cost to make	$4,912.85	$0.3241

TABLE III—HOW POTATO PRICES and Solids Content Influence Manufacturing Costs of Flakes

Cost per 100 lb.	$.60	$.60	$1.14	$1.14	$1.68	$1.68
Solids content	18.5%	22.0%	18.5%	22.0%	18.5%	22.0%
Fixed capital	$290,900	$332,900	$290,900	$332,900	$290,900	$332,900
Working capital	$279,900	$314,900	$328,500	$365,800	$377,600	$417,200
Total capital	$570,800	$647,800	$619,400	$698,700	$668,500	$750,100
Cost of potatoes per lb. of flakes	$0.0430	$0.0362	$0.0816	$0.0686	$0.1204	$0.1013
Total cost per lb.	$0.285	$0.257	$0.324	$0.289	$0.364	$0.323
Production, lb. per yr.	3,031,600	3,776,200	3,031,600	3,776,200	3,031,600	3,776,200
Cartons per day (8 servings, 2 pkg.)	40,058	45,170	40,058	45,170	40,058	45,170
Cost per carton	$0.108	$0.107	$0.123	$0.121	$0.138	$0.135



Moynos pump mustard to the filling line at Plochman & Harrison, Chicago and Jersey City. The Moyno can carry liquids, pastes, solids in suspension, abrasive-laden slurries—almost anything that will go through pipe—with positive, non-pulsating pressure.

Mustard Mill Changes to MOYNO® Pumps to Get Positive Displacement, Longer Pump Life

A Moyno Pump installation at Plochman & Harrison, makers of the famous Premium Brand Mustard, illustrates the outstanding performance of the Moyno Pump. They have been pumping mustard to a filling line with the Moyno for over two years without a single replacement of parts. They are replacing other pumps with Moynos.

The mustard is pumped as a semi-solid. In addition, it has both an acid and an abrasive content which causes other pumps to wear out in a few months. Moynos handle a wide variety of products that are not pumpable with other types of pumps. These include potato salad, chow mein, fruit, acid, alkalis, pastes, abrasive slurries, paints, tar, cement, plaster, many others.

The Moyno has a unique rotor and stator arrangement which forms sealed progressing cavities that move the material, providing positive displacement. For this mustard handling job parts were made of stainless steel to assure trouble-free service and long pump life. Rotor and stator are available in other alloys, or plastic compositions.

Note the outstanding features of the Moyno shown at the right. Perhaps your pumping problems can be solved with the Moyno. Write us today! Ask for a free copy of Bulletin FE It will give you complete facts!

Features of the MOYNO that may solve YOUR pumping problem

Gentle: no churning; won't break up semi-solids . . . won't aerate liquids. May be used for metering.

Reversible: pumps with equal efficiency in either direction.

Trouble Free: self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

Positive Displacement: Moynos are available to pull up to a 29" vacuum while discharging under pressure. Big Moynos deliver up to 500 g.p.m. Pressures to 600 p.s.i. plus are available.

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Fractional and Integral HP Motors

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It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

pacted by shaking will be about 12-lb./cu. ft. for high solids potatoes and about 9-lb./cu. ft. for low solids ones.

Marketing the product on the basis of servings, rather than on actual weight, would give the processor of low-solids potatoes an advantage—for flakes from such potatoes require more liquid on reconstitution.

For example, flakes made from western-grown Russet Burbanks, of about 22% solids content, require 4¼ parts liquid per part of flakes in order to form a good mash. The same variety of potatoes grown in the East and having 18½% solids requires 5½ parts of liquid per part of flakes to yield a mash of the same consistency. Incidentally, Maine grown Russet Burbanks, Green Mountains, and Katahdin have yielded good products by this process.

Net result is that a package containing sufficient flakes for four servings would contain about 90g. if made from low-solids potatoes, and about 100g. if made from high-solids ones.

For good keeping properties, the package should include an effective moisture barrier. In the market tests, therefore, there was used a cardboard carton containing two heat-sealed envelopes, with enough flakes in each to yield four servings on reconstitution. Envelopes are 6x7 in., and are made of a laminate (polyethylene, aluminum foil, bleached kraft).

True, this is an expensive package. But it appears justified in order to preserve, as long as possible, the initial good flavor of the product.

No storage tests have been made on this package. However, flakes packed in tin cans in air were still acceptable after six months' storage at room temperature.

Estimated Costs

Engineers at EURB have compiled a detailed estimate of equipment and operating costs for a plant producing 15,000 lb. of 4½%-moisture flakes per day from low solids potatoes, or 18,800 lb./day from high-solids tubers (see accompanying flowsheet). Plant is assumed to operate 24-hr./day, 6 days/wk., 200 days/yr.

Since production would probably be initiated in a plant already processing potatoes into other forms, availability of storage and conditioning facilities, as well as steam supply and building space, is assumed. Rent for these facilities, however, is charged against the flake operation.

It is further assumed that new equipment will be used throughout the plant, with liberal allowances made for engineering fees and erection.

Table I shows capital costs, Table II is a cost sheet, and Table III shows effect of potato prices and solids content on manufacturing costs.

From these tabulations it is apparent that a plant producing 15,000 lb./day of flakes packaged for retail distribution, and using 18.5% solids potatoes costing $1.14 per 100 lb., will have a cost of approximately 32¢ per lb., or about 12¢ per package containing servings for eight persons.

Acknowledgment: The above feature is based on information supplied by R. K. Eskew, Head Engineering and Development Section, Eastern Utilization Research Branch, USDA, Philadelphia. Also included is data from Bulletins ARS-73-2, 73-9, and 73-12.

Big Bottles Mean Big Savings

—*Continued from page 81*

the conveyor is in a vertical position.

Flow from the bottle-shop is by live-roll conveyor. At its discharge end, a series of five limit switches provide semi-automatic operation. These switches are arranged in sequential series. They are positioned on the line so that five crates will close them and actuate the system.

A rocker arm, driven by compressed air cylinder, is located directly above this conveyor. It has three vertical members, each equipped with rubber rollers.

One roller, in conjunction with a mechanical stop located level with the conveyer rollers, stops the last bottle on the live conveyor line. The other two roller units are adjustable, and are used to stop either the 5th or 6th bottle in the line, according to the setting of the unit for delivery of either 4 or 5 bottles to the stacker.

At the start of operations, the rocker arm and mechanical stop are in position to curb the flow of bottles from the live roll conveyor. The gravity-roller conveyor (stacker) is in vertical position.

When set to stack 4 bottles, the unit starts when 5 bottles have closed their limit switches. First, the roller conveyor swings in a 90-deg. arc to horizontal position. Then the rocker arm end rises to release the neck of the last bottle. And as it rises at one end, the other end positions its stop at the neck of the 5th bottle, curbing the flow. Now the mechanical stop is depressed and these four bottles move onto the roller conveyor.

This conveyor then gently swings in its arc, positioning the bottles in vertical plane so they may be removed by handtruck. These are then loaded six stacks to the pallet to be moved by fork-truck directly to delivery truck or to storage.

As the operator moves his handtruck load away from the stacker, he backs into the body-switch—a 3 ft. horizontal bar—and the cycle is repeated.

To eliminate breakage and also make lift-truck operation efficient, trucks are equipped with specially designed, hydraulic clamps. After the lift-truck operator inserts the forks into the pallet, he closes this clamp and thus the crated bottles are held firmly between clamp and pallet.

To hold bottles safely in transport trucks and trailers, A-P designed a compartment body equipped with special safety gates. The compartments are specifically sized to accommodate the pallets. The gates, fabricated of aluminum, have two vertical and three horizontal bars. These are positioned to hold pallet-loads of either four- or five-high stacks (three wide on each pallet).

The top horizontal member of each gate has bar extensions, one on each end. These fit into slots in the top of each compartment wall. Bottom bars have two Western Truck hooks, fixed so they may be turned to lock in the compartment-wall holes.

End (*Resume reading on page 82*)

Better Carton Needed

—*Continued from page 59*

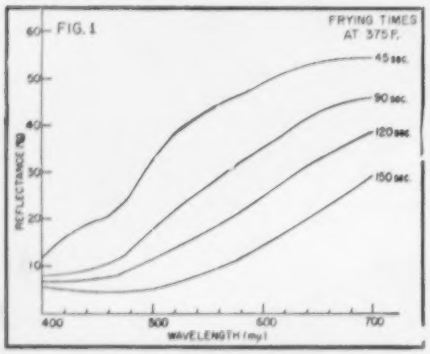
Now it is time for inter-industry consultation—between package designers and warehouse and transportation men. Cooperation by these three groups can solve present day problems and reveal needed packaging improvements.

References and Bibliography

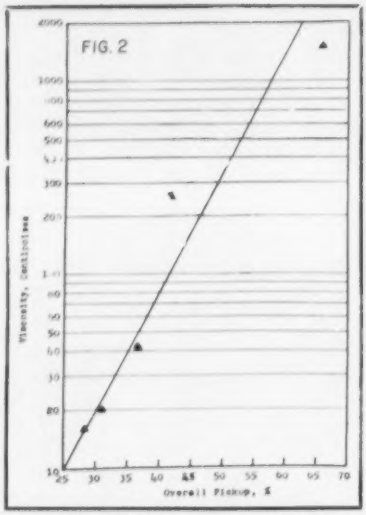
1. Walter Stern, *The Package Engineering Handbook*, Board Products Pub. Co., Chicago.
2. K. Q. Kellicutt and E. F. Landy, "Safe Stacking Life of Corrugated Boxes". *Fiber Containers and Paperboard Mills*, Sept 51.
K. Q. Kellicutt, E. F. Landy, and V. C. Setterholm, *Basic Design Data for the Use of Fiberboard in Shipping Containers*, No. R 1911-A, Forest Products Laboratory, Forest Service, USDA, Madison, Wis. Dec. '52.
C. H. Pearce, *Packaging Materials Handling*, Business Service Bulletin No. 122, Business & Defense Services Admin., USDC, Washington, D. C. May '55.
H. C. Diehl, "How to Make Cartons Behave", *Western Industry*, Oct. '54, p. 60.

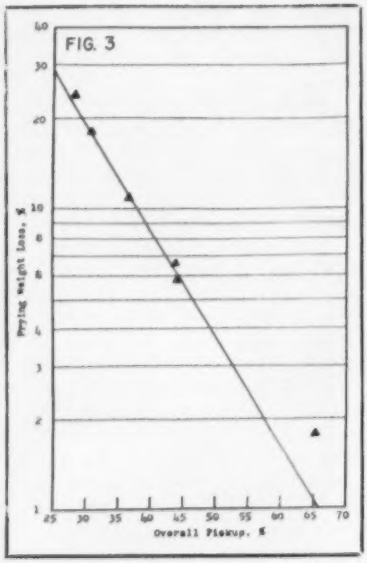
End (*Resume reading on page 60*)

How Prime Q. C. Elements of Sticks Are Related



COLOR DEVELOPMENT: These reflectance measurements made by spectrophotometer show the progressive darkening of fish sticks as frying time is increased. Such readings, especially in the red portion of the spectrum (600-650 mμ. range), give excellent correlation with subjective grading scores. MIT taste panel preference: Sticks with medium color.





OVERALL PICKUP varies linearly with logarithm of batter viscosity (left graph) and percent frying weight loss (right graph).

Quality Variables Pinpointed For Fish-Stick Makers

New findings correlate process and ingredient factors that boost quality—hence sales appeal—of this popular heat-and-serve item. Criteria include color, pickup of breader and batter, frying weight loss, and fat absorption

STEPHEN J. LIROT and JOHN T. R. NICKERSON
Dept. Food Technology, Massachusetts Institute of Technology, Cambridge

HOW DO PROCESSING and coating ingredients affect the quality of frozen precooked fish sticks? —Or more to the point, what are the possibilities of continuing their upsurge in popularity, which has already boosted the pack from 7.5 million lb. in '53 to a whopping 67 million lb. in '55?

These questions formed our prime target in recent research at Massachusetts Institute of Technology.

As criteria of quality we chose color shade and hue, overall breader and batter pickup, frying weight loss, and fat absorption. Processing and ingredient factors included: Frying time and temperature, batter characteristics (viscosity, solids, egg yolk content, and flour type), and breader moisture content and meal type.

In additon, we correlated taste-panel color scores with measurements made by a rapid-scanning spectrophotometer.

Our results show that—

1. **There is a highly significant correlation between subjective color grading and spectrophotometer reflectance values in the red portion of the spectrum for sticks fried in oil, frozen, then defrosted and oven heated for 15 min. at 400 deg. F. Further, taste-panel scores indicate a preference for sticks with shades in the central portion of the range, neither too light nor too dark.**
2. **Percent overall breader and batter pickup of uncooked sticks appears to vary linearly with the logarithm of both batter viscosity and percent frying weight loss. The latter increases as overall pickup decreases.**
3. **Coating performance is greatly affected by the specific flour or flour combinations used in the batter.**
4. **Above 3%, increasing concentrations of egg yolk solids in the batter reduces its viscosity and overall pickup by uncooked sticks.**
5. **Compared with batter containing 3% egg solids, one with no egg solids produces slightly greater fat absorption and weight loss during frying. A concentration of less than 3% egg solids in batter mixtures may be desirable.**

Recently, the U. S. Fish & Wildlife Service published partially complete, tentative, voluntary federal grade standards for fish sticks. They require evaluation of the sticks on the bases of: Color, organoleptic tests, presence

of undesirable features, and chemical and physical objective measurements.

Butler[2] and Holston[3] graded the color of fish sticks by using a hedonic scale with values ranging from 1 to 10. Holston found that a cracker-meal breader produced a golden hue that darkened slowly, wheat cereals gave a golden brown hue, and bread crumbs darkened most rapidly, turning brown during frying.

Using two sets of preparation conditions, minimal and optimal, Umpleby *et al*[3] found greater overall pickup under optimal conditions of breading, but no differences in fat absorption during frying. Water losses during frying were twice as great under the minimal conditions.

In our research we worked with frozen (uncooked) cod sticks, 3.8x1.0x0.5 in., obtained from a local packer. A tolerance of ±0.05 in. on each dimension was maintained.

Preparing the Sticks

Liquid batters were made from dry solids and water by mixing in a Waring Blendor for 2 min. To prevent incorporation of air, this unit's speed was reduced with a Variac and the liquid surface was covered with the bottom of an Erlenmeyer flask.

Battering was carried out by dipping a three-stick sample held in a wire basket. Batter temperature was 55-60F. Immersion time varied from 15-25 sec. in different runs but was constant for a given comparative experiment.

Samples were cooled with dry ice for 15 min. before coating and drained for 10 sec. after battering. After draining, they were placed in a breading jar, which was rotated 10 times. Excess breader was removed by gently shaking the treated sticks in a wire basket.

Cooking was done in a thermostatically controlled fryer. There was a 6-10F. drop in oil temperature when three samples were fried simultaneously at 360-400F. After frying, sticks were cooled in air at room temperature on a sheet of aluminum screening.

For purposes of statistical evaluation 10 three-stick samples were used to determine overall pickup and frying weight loss. To eliminate effects of changes in frying-medium composition upon fat absorption, sets of 30 samples to be compared were fried in an alternate sequence, each set being exposed to the same range of oil conditions.

Gaging Quality

Stick color, hue, and shade were measured by a spectrophotometer with reflectance attachment. An oscilloscope camera recorded the visible reflectance spectrum from 400 to 700 μ.

Samples were presented to the reflectance aperture, wide side down, on a Lucite disk. Measurements were made on sticks thawed and cooked for 15 min. in an oven at 400F.

TABLE I—COLOR RATINGS by Non-Expert Panel Agree With Instrument Scores

Sample	Panel Score*	RSS** % Reflectance R_{460} mμ.	R_{500} mμ.	R_{550} mμ.	R_{600} mμ.	Panel Pref.***
A	1.0	42	48	53	57	4.3
B	2.0	22	30	38	46	2.2
C	3.0	14	20	28	38	2.0
D	4.0	9	19	21	30	2.8
E	5.0	6	10	16	25	3.7
Correlation coefficient	r	−0.934	−0.957	−1.000	−1.000	

*1 = lightest shade, 5 = darkest shade (average of 23 judgments).
**Rapid-scanning spectrophotometer.
***1 = most desirable, 5 = least desirable.

Batter viscosities of the non-Newtonian fluids was measured at 70F. with a Brookfield synchro-electric viscosimeter.

Total solids and fat content were determined by the A.O.A.C. Official Methods of Analysis[4] for meats. The entire sample was ground with a motor-driven food grinder, then mixed. Samples of 3-5g. were next air dried at 250 ± 10F., and a Soxhlet petroleum-ether overnight extraction followed. Results were expressed as:

$$\% \text{ Total solids} = \frac{\text{wt. dried sample}}{\text{wt. undried sample}} \times 100$$

$$\% \text{ Fat (moist basis)} = \frac{\text{wt. extract}}{\text{wt. undried sample}} \times 100$$

$$\% \text{ Fat (dry basis)} = \frac{\% \text{ fat (fresh basis)}}{\% \text{ total solids}} \times 100$$

$$\% \text{ Fat absorption} = \frac{(1 - \% \text{ wt. loss})}{100} \text{ (\% fat, moist basis)}$$

Five different color shade samples, obtained by varying frying times from 45-180 sec., were presented to a 23-member non-expert panel, who were asked to rank them in order of light to dark on a numerical scale from 1 to 5. These samples were then examined in the spectrophotometer, and correlation coefficients were calculated between subjective scores and percentage reflectance at four wavelengths.

Test Methods

Data showing the influence of frying time and temperature on weight loss, total solids, fat content, absorption, and color development were obtained by frying two sets of four samples at 375 and 400F. Four frying times, 45, 90, 120, and 150 sec., were used at each temperature.

To determine how solids content of a liquid batter affects its performance, three samples were battered, breaded, and fried. These batters contained 10, 20, and 35% solids, respectively.

Effect of egg yolk solids in the batter was gaged by

TABLE II—HOW FRYING TIME and TEMPERATURE Affect Weight Loss, Fat Absorption, and Stick Color

Frying Temperature (Deg. F.)	Frying Time (Sec.)	Wt. Loss (%)	Fish Sticks Analyses: Total Solids (%)	Fat Moist (%)	Fat Dry (%)	Fat Absorption (%)	Reflectance Values: 500 mμ	550 mμ	600 mμ	650 mμ
375	45	0.9*	31.9	8.5	26.6	8.6	32	43	49	54
	90	3.9	35.3	10.5	29.8	10.1	18	27	36	43
	120	8.9	37.9	11.7	31.0	10.7	12	18	25	33
	150	11.2	39.5	12.0	30.4	10.7	6	10	14	22
400	45	1.0	32.4	9.3	28.1	9.2	25	34	41	47
	90	7.7	36.2	11.1	30.6	10.2	11	16	22	30
	120	11.8	38.6	11.1	28.6	9.8	6	10	15	23
	150	17.8	41.9	12.4	29.4	10.2	3	4	6	10

*Weight gain in frying.

preparing four samples with batter containing 0, 3, 9, and 15% (solids basis) of egg yolk.

And to check the flour ingredient, the following flours or flour mixtures were used: Rice-wheat, rice-gluten, rice-corn, rice, corn, rice-soya. Each of the six batters consisted of 2% egg yolk solids, 2% non-fat milk solids, 2% salt, and 94% of the flour or flour mixture. Six different samples were prepared in the standardized manner, including cooking, after which reflectance values, moisture, and fat analyses were made.

Relation of liquid batter viscosity to overall pickup was studied by varying viscosity alone in a series of corn-flour water suspensions. Various levels of guar gum were used in the mixture, from 0 to 0.5%. Difference in overall batter pickup was then measured on ten samples of fish sticks for each batter viscosity examined.

The "T test" method[5] was employed to determine significance between mean values for certain criteria.

Analyzing the Data

Results of organoleptic and spectrophotometric evaluations of color of fried fish sticks are detailed in our accompanying Table I. Extremely good correlation between the two systems of color-hue grading was obtained at wavelengths of 600 mμ. and 650 mμ. It is evident from panel scores that shades in the central portion of the range, neither too light nor too dark, were preferred.

Table II shows that frying loss increases significantly as frying time is prolonged both at 375 and 400F. The higher moisture losses due to frying are indicated in the finished products as increases in total solids content. Weight loss differences at various temperatures and frying times are significant at the 5% level, also total-solids-content differences at the 45-sec. frying time at the two temperatures.

Moist-basis fat content is significantly higher (5% level) at 400F. than at 375F. at frying times of 45, 90, and 120 sec.

Frying time influences fat content and fat absorption more than does frying temperature. The major rise in fat absorption at both temperatures occurs as frying time increases from 45 to 90 sec.

Surface reflectance, at all wavelengths, decreases with increased frying time at both temperatures, with rate of darkening being greater at the higher level (Fig. 1).

As shown in Table III, batter pickup increases only slightly as batter solids vary from 10-20%, but markedly as they are raised from 20-35%. Moisture loss during frying, on the other hand, is much greater with the low-solids-content batters. These differences are more pronounced as batter solids range from 20 to 35%.

Fat absorption during frying and fat content of the sticks are greatest at a liquid-batter solids content of 20%, and least at 35% solids. This is also true of the figure for total solids, which reflects the increased fat pickup at 20% liquid-batter solids. All of these differences are significant at the 5% level.

As egg yolk solids of dry batter are brought up from 0 to 3, 9, and 15%, liquid-batter viscosity drops and there is a decrease in overall batter pickup. The difference in batter pickup is significant (1% level) with 0 and 15%, and 3 and 15% egg yolk solids. Increase in weight loss during frying between the 3 and 15%, and 3 and 9% egg yolk levels is significant at the 5% level. The higher weight losses occur at the higher egg solids content.

However, although the differences are not significant, there is a greater weight loss during frying when no egg solids are used than with an egg solids content of 3%.

Fat absorption during frying follows the same pattern shown by weight loss, which indicates that in concentrations less than 3% some egg solids may be desirable. Effect of egg yolk solids on batter performance is also shown in Table III.

Flour Types

Results of variations in the flour component of batter mixtures are listed in Table IV. Overall batter pickup ranges from 28.3% for rice flour to 65.2% for the rice-soya mixture when batter solids content is 30%.

Fat absorption is greatest with the rice-gluten flour mixture and least with rice flour alone. Results for rice-corn mixtures are not much greater than those for the plain rice flour mixture. Except in the case of the rice-soya mixture (the soya flour contained 6% fat), fat absorption rises with increasing overall pickup and decreasing frying weight loss.

A logarithmic plot of batter viscosity against percent overall pickup suggests a straight line. This indicates that raising the batter pickup about 15% (based on weight of stick) requires a tenfold increase in batter viscosity (Fig. 2).

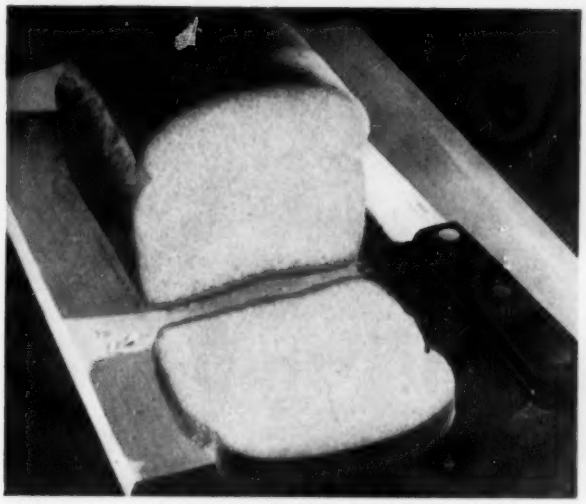
(*Turn to page 189*)

TABLE III—BATTER PERFORMANCE Varies With Total Solids and Egg Yolk Content

Liquid Batter Total Solids (%)	Liquid Batter Viscosity (Cp.)	Overall Pickup (%)	Weight Loss (%)	Fish Stick Analyses: Fat (Moist) (%)	Fat (Dry) (%)	Fat Absorption (%)	Total Solids (%)
10	4	12.8	29.5	7.9	24.1	5.6	32.8
20	9	13.9	23.7	9.4	27.7	7.2	33.5
35	359	25.3	9.5	6.1	19.6	5.5	31.2
Dry Batter, Egg Yolk (%)							
0.0	297	49.3	7.8	10.7	30.3	9.9	35.4
3.0	250	48.3	6.2	9.9	29.5	9.3	33.4
9.0	189	43.2	9.4	11.7	33.5	10.6	34.8
15.0	163	42.1	12.2	12.5	35.7	11.0	35.0

TABLE IV—HOW VARIOUS FLOURS or Flour Mixtures in Batter Affect Fat Absorption, Color Development

Flour	Fat (Moist) (%)	Fat (Dry) (%)	Fat Absorption (%)	Total Solids (%)	Reflectance Value: 500 mμ	550 mμ	600 mμ	650 mμ
Rice-wheat	12.3	35.4	11.6	34.8	23	31	37	45
Rice-gluten	13.0	36.7	12.1	35.4	16	23	30	39
Rice-corn	9.3	29.2	7.6	31.8	21	28	34	40
Rice	9.0	28.4	6.8	31.7	32	38	42	46
Corn	9.7	30.2	8.6	31.9	20	30	37	45
Rice-soya	11.7	31.9	11.5	36.6	8	13	21	31



Sugar is the key to wheat flavor in bread. And of the basic sugars that nature provides, many bakers have discovered that Cerelose brand dextrose—the sugar made from corn—produces more of the finer flavor overtones in baked bread than any other sugar.

Preserving the piquant flavor of tomato products, Cerelose brand dextrose is a reducing sugar that will not mask delicate spice flavors with sweetness. Also, by retarding oxidation, Cerelose increases the shelf life of the natural red tomato color.

To boost flavor...without over-sweetness... more and more food processors are using

CERELOSE®
BRAND DEXTROSE

THE SPECIAL SUGAR THAT DOES SPECIAL THINGS FOR FLAVOR IN FOODS

All too frequently, true fruit flavor is masked by the sweeteners in the preserving syrup. When syrup concentrations must be increased to prevent bacterial spoilage and retain the fruit's fine texture, Cerelose brand dextrose sugar is used to protect the flavor . . . without over-sweetness.

Cerelose brand dextrose sugar is more than just a sweetener here. It accentuates the presence of butterfat to produce the kind of richness Americans like in ice cream. Also, in sherbets and ices, Cerelose allows the manufacturer to increase body without increasing sweetness.

Our technical staff welcomes the opportunity to show you why you should use Cerelose brand dextrose sugar in your formula. Call us today.

1906 • **50th ANNIVERSARY** • 1956
CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

For more data, circle this page number on card at front →

Last year truck operators bought 10,000 more heavy-duty* INTERNATIONALS than any other make!

And it's been like that every single year since 1932. For the past 24 straight years, 25% or more of all heavy-duty trucks sold have been INTERNATIONAL. The reason is simple: Fleet owners' records *prove* INTERNATIONALS cost less to own and operate. Let your INTERNATIONAL Dealer or Branch start saving you money, right now! INTERNATIONAL HARVESTER COMPANY, Chicago.

*16,001 lbs. GVW and up, 1955 new truck registrations.

INTERNATIONAL® TRUCKS

FIRST with men who know truck costs!

This 2-Axle Light-Body Engineering—

Jumps Trailer Payloads 48%

Careful attention to design factors and legal limits did it. Further, there's better protection for cargo, also advertising display areas

DEVELOPMENT of an efficient tractor-trailer combination has scored a 48% payload climb for Schaefer Brewing Co., New York City, in its distribution to suburban depots.

The present combination of tractor and aluminum-bodied trailer not only boosts cargo weight but also cuts loading and unloading time, thanks to carefully engineered design advantages.

The unit is used for keg-and-case distribution to stations in New York, Connecticut, and New Jersey.

Touching the Mileposts

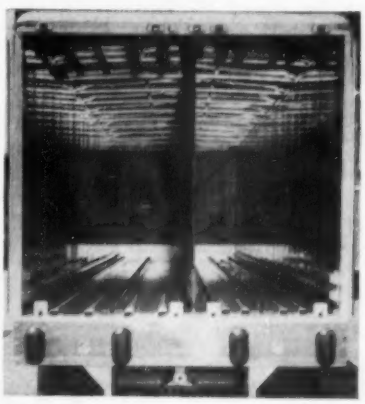
Prior to 1947, the company used a heavy tractor and closed-body or flat-bed trailer. Maximum allowable payload was 27,000 lb. Cases and kegs were loaded by hand trucks and covered over with a tarpaulin.

Ground-level pallet loading, introduced in 1947, sped trailer loading and unloading. But it left certain other operational drawbacks. These included the time required to secure the tarp in place and the added safety hazard.

In addition, packages on pallets shifted enroute and dirt and rain sifted in on the cartons. The tarp-covered load has no advertising value.

In 1951, the heavy trailer was replaced with a lightweight single-axle trailer with an aluminum closed or panel-type body with rear-end pallet loading and unloading. This trailer weighed 2,000 lb. less than the flat bed. And since the same tractor was used, the payload was upped to 29,000 lb.—an increase of 2,000 lb.

This new trailer did away with the cumbersome tarpaulin, and it offered a display surface for advertising.



INSIDE VIEW of trailer shows off-center partition and series of floor rollers. Eighteen 36x44-in. pallets may be stacked—10 on left side, 8 on right.

Partitioned Trailer

The trailer was unusual in that it was divided longitudinally into two compartments by a vertical plywood partition placed off the centerline of the body. It accommodated two rows of pallets, utilizing the full clear width of the body.

It was fitted with three sets of rollers on the floor on both sides of the partition. These aided in moving the pallets within the trailer. Unloading and loading was by fork-lift trucks operating from ground level.

This first aluminum trailer proved so successful that six more were added.

Development of the final trailer rested on two factors: (1) Going to a lighter weight tractor, and (2) taking advantage of state laws which permitted an increase of 10,000 lb. (from 50,000 to 60,000 lb.) in gross allowable laden-vehicle weight. This called for two axles, instead of one, under the trailer. And it depended on keep-

ing under certain tractor and trailer axle loadings.

Result was a 33-ft. tandem-axle trailer weighing 9,500 lb. and a 10,500 lb. tractor. Deducting this 20,000 lb. from the gross allowable laden weight of 60,000 lb. meant 40,000 lb. of payload—a 13,000-lb. increase (48%) over the old 27,000 lb. unit.

In the new trailer, axle weight distribution is 7,000 lb. on the tractor front axle, 21,500 lb. (against a 22,400 lb. gross allowable) on the tractor rear axle, and 31,500 lb. (against a 36,000 lb. gross allowable) on the tandem trailer axle.

Efficient Pallet Stacking

In the body, the partition is again set slightly off center (4 in. to the right). This permits stacking the 36x44-in. pallets lengthwise on one side, widthwise on the other.

This difference in stacking was necessitated by the legal allowable outside width of the body of 8 ft., giving a clear inside width of 6 ft. 8 in. after deductions for the sub rails, thickness of the vertical side posts, the partition, inside rubbing strips, and clearance between the pallets. Ten pallets are stacked on the left side of the partition and eight on the right.

On the flooring, three sets of rollers are carried on small angle irons which extend the full inside length of the body. The rollers are of 3-in. dia. and are spaced 7 in. apart in the left set, and 3½ in. on the right.

In late 1955, the Schaefer fleet consisted of 18 new lightweight tractors, 6 flat bed trailers, 7 single-axle 28-ft. aluminum body trailers, and 23 of the 33-ft. tandem-axle trailers.

These last are employed in over-the-road suburban depot distribution. Flat beds are used only to deliver beer to steamship piers and railroad depots within the city limits.

How Brewer Boosted Payloads "Half Again" in 7 Years

	Weights in Pounds		
	1947	1951	1954
Tractor empty	13,875	13,875	10,500
Flat-bed trailer	9,125	7,125*	9,500**
Total vehicle	23,000	21,000	20,000
Allowable gross laden	50,000	50,000	60,000***
Payload	27,000	29,000	40,000

* 28 ft. single-axle aluminum-body trailer
** 33-ft. tandem-axle aluminum-body trailer
*** Connecticut (62,000 lb. in New York)

Getting True Sugar %

—*Continued from page 55*

investigated. Here, sucrose content was analyzed, in addition to salt and acid.

It was found that a solution containing 1% acetic acid gives a reading of 0.5 Brix. And that this ratio is consistent within a range of 1-4% acid.

Sodium chloride contributes greater refractometric readings. But these are not directly proportional to the amount of salt in the brine.

For example, 1.0% salt gives a Brix reading of 1.5 deg. However, a 4% sodium chloride solution reads 5.0.

In the analysis of sour pickle brines, it was proved that the separate effects that salt and acid have on refractometer readings are additive. Calculated readings, based on the analyses, agreed very well with observed total Brix readings. Average difference was only 0.2 Brix. This was probably due to dissolved materials not analyzed (such as alum and solubilized spice oils).

The above principles were next applied to sweet pickle brines. And again, calculated results closely paralleled observed readings. Average error was 0.6 deg.

The high Brix value of acetic acid and salt can be clearly seen in our accompanying table. In the average sweet pickle brine (sample f)—containing 1.8% acetic acid, 3.3% salt, and 32.1% sugar—Brix of acid and salt is 5.2. Since total Brix is 37.3, disregard of the salt-acid factor by the processor would result in an error of nearly 14%.

References

1. Bell, T. A. and Etchells, J. L., "Sugar and Acid Tolerance of Spoilage Yeasts From Sweet Cucumber Pickles", *Food Technology*, 6, 1952, p. 468.
2. Switzer, R. G. and Fabian, F. W., "Two-Hundred Tell What They Prefer in Pickle Sweeteners", FOOD INDUSTRIES, Nov. '40, p. 38.
3. Richardson, D. E. and Switzer, R. G., "Methods of Testing Acid and Salt in Pickles and Pickle Products", *Fruit Products Journal*, 18, p. 292, 1939.
4. Browne, C. A. and Zerban, F. W., *Physical and Chemical Methods of Sugar Analysis*, 3rd Ed. (1941).

End (Resume reading on page 56)

Film Feed Problems

—*Continued from page 78*

tween 12,000 and 14,000 lb. of meat.

This is accomplished with two wrappers that handle the entire output of eight slicing machines (U. S. Slicing Machine Co.). One unit normally takes square cuts, but can be quickly converted for twin-pack products by simply switching dies in the head. The other machine wraps round or square cuts.

Here's how packaging and sealing difficulties were licked through cooperation of Wrap-King and Dow.

How Pull Does It

Saran is notorious for its "clingyness," which makes it almost impossible to push this film into packaging machines.

Therefore, in Nepco's wrappers, material is pulled from roll to wrapping stage—supported by rollers and belt conveyors nearly all the way. Film's static cling is used to advantage, since material is held firmly to two special ¼-in. belts used as carriers (see photo).

Heat sealing offers problems. For rotary and sliding-plate-type heaters tend to scuff the folded package flaps. To beat this, machines have reciprocating sealers, installed on rotary machine heads, that move with the packages. Pressure is released before package ejects from the head.

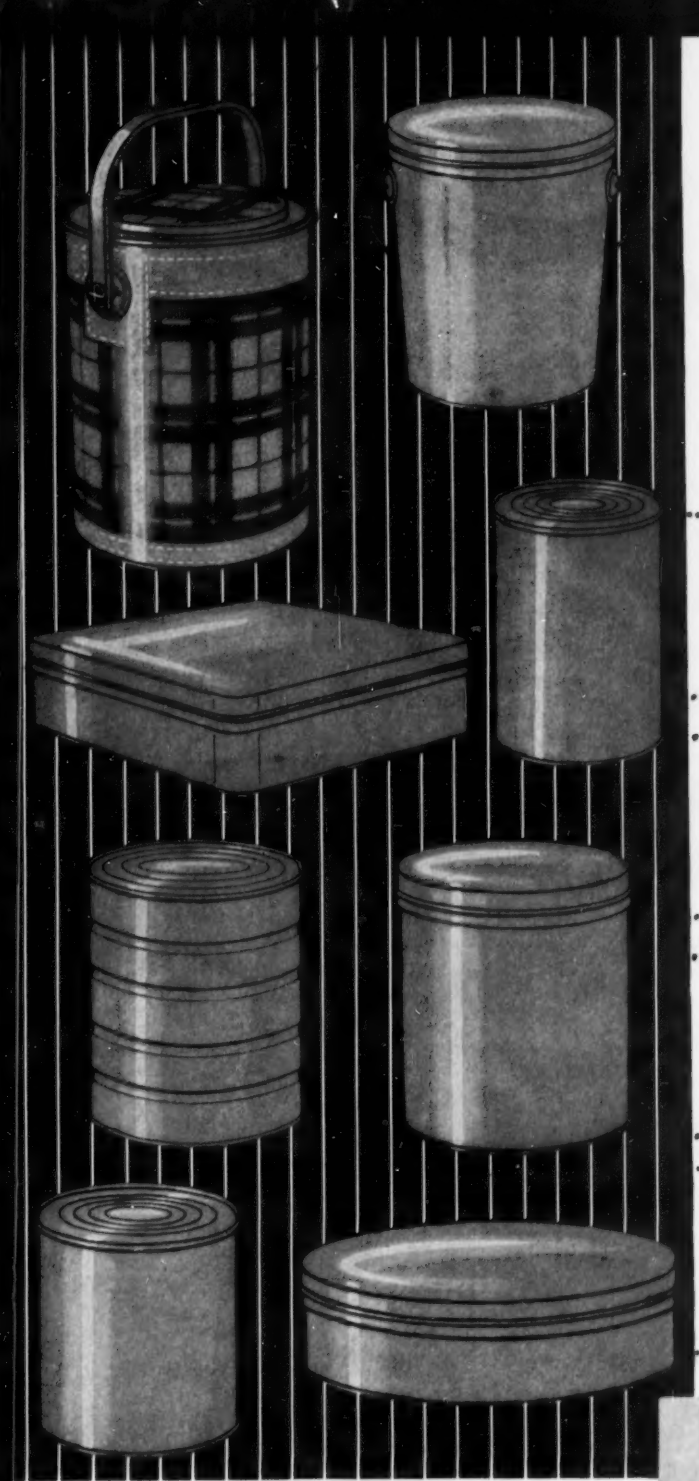
Once film is wrapped around the meat, its features create an ideal package. The heat sealer automatically causes the material to shrink to a tight fit. No further treatment is necessary.

However, the company is now considering installation of an accessory device to tighten packages even further. This equipment (Great Lakes Electric Mfg. Co.) directs two jets of hot air against package sides, which are not touched by the heat sealers.

The clinging quality of Saran causes it to adhere closely to the meat during wrapping—thus excluding almost all air.

Furthermore, company officials assert that the 50-gage film is comparable, price-wise, with other packaging materials. Properly applied, it gives a covering that is almost invisible to the eye. And this film stays crisp throughout shelf-life period without wilting.

End (Resume reading on page 81)



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Product Planned Metal Containers by HEEKIN

Economical Metal Packaging by Heekin for the baking industry has increased sales for many bakers. Heekin Cans "eye appeal" makes the sale for your profit.

No matter your product, Heekin's engineers and packaging experts have the answers to metal packaging production problems.

Heekin's personal attention to every detail in metal packaging will help solve your packaging production problems and increase your profits.

Women buy more than 80% of all items in metal packages . . . they are smart buyers . . . sell them in Heekin Product Planned Cans.

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IF competition demands that your product go to market in the metal package that is most profitable for you, you should know the story of Heekin *Product Planned* Cans. Regardless of your product, no matter your market problems, you'll find that Heekin . . . *with fifty-five years of metal packaging experience* . . . will have the answer. The metal package that Heekin delivers to you will be the one most ideally suited for your product. Call Heekin for the metal package . . . either *plain or lithographed* . . . that is product planned for your product and your profit.

FINISHED FREEZER FACILITY has floor, walls, and ceiling of self-supporting cellular glass blocks. No vapor barrier is needed, since cells of blocks are hermetically sealed. Behind protective wooden bumper (left) is seen free-standing wall that divides space into two areas. This permits most efficient operation—alternate freezing of stock on one side while just-frozen stock is shipped from the other. In addition, the insulation is completely fireproof.

Freezers and Coolers Speedily Built at Less Cost

It's Done With Cellular Glass Blocks

A. J. MONTA

Chief Engineer, The Welch Grape Juice Co.

A NEW TYPE of low-temperature enclosure—quickly erected and less expensive—has been developed by engineers of our organization, The Welch Grape Juice Co. And thus provided is the additional freezer and cooler space demanded by our rapidly expanding operations.

Specifically, freezers and coolers constructed of blocks of cellular glass insulation (Foamglas, Pittsburgh Corning Corp.) have been installed at our Brocton and Westfield (N. Y.) plants. Walls of the facilities are erected, in most instances, as free standing units of the insulation alone. The blocks are merely painted with a vinyl emulsion finish, and a wooden bumper is placed on the inside of the room.

► It is our calculation that use of this new technique saves us at least 10% in initial cost of construction. In addition, this method, being considerably faster, gets coolers and freezers into service in a shorter time.

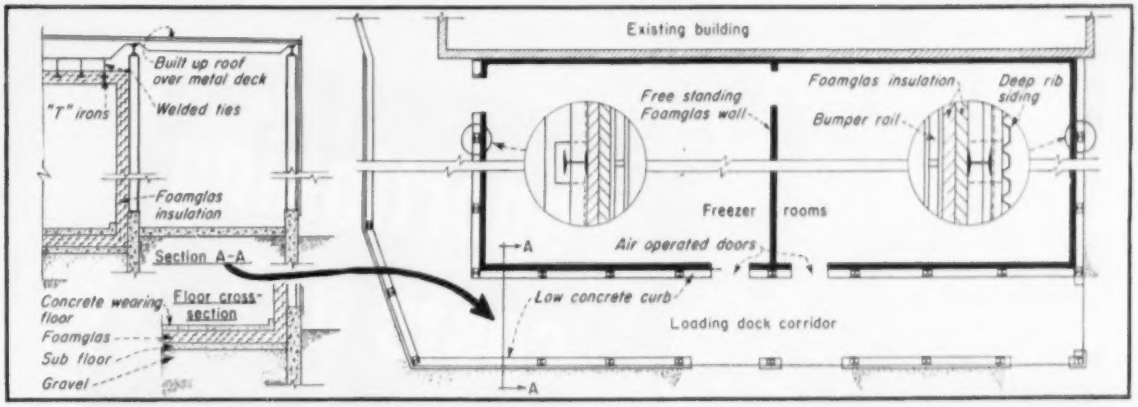
Further, experience has shown that the sealed cellular structure of the insulation is impervious to moisture. This precludes any rise, over the years, in refrigeration requirements—for there is no moisture pickup to cut insulating value of the material.

Also, this insulation is completely fireproof and meets all insurance requirements.

How We Went About It

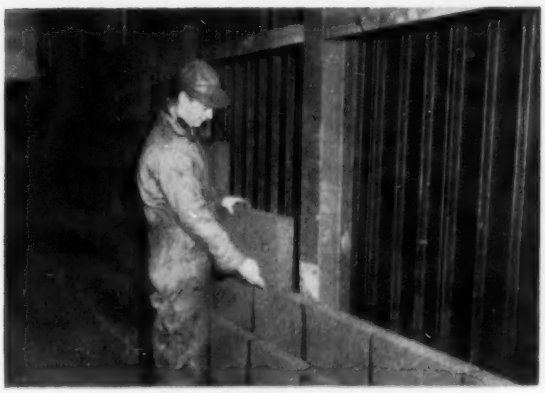
Floors of our rooms are constructed on grade, and consist of 3-in. sub-slab,

(*Turn to page 152*)



STRUCTURAL DETAILS. Galvanized steel paneling (L. C. Smith) guards against pilferage and allows corridor on two sides for lift-trucks to carry product to and from freezer and loading dock.

RIGHT: Outside view of Brocton concentrate freezer addition as it neared completion.



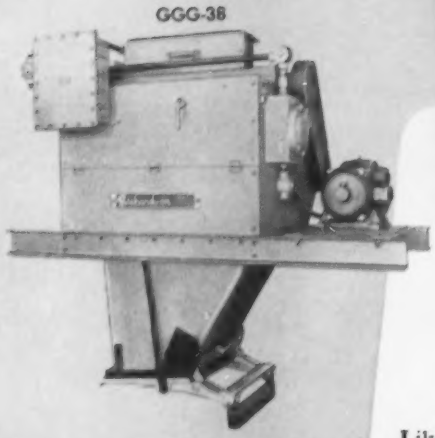
Steps in Erection

ABOVE LEFT: Outer wall going in—two layers of 3-in. blocks. **ABOVE RIGHT:** Free-standing dividing wall is begun.

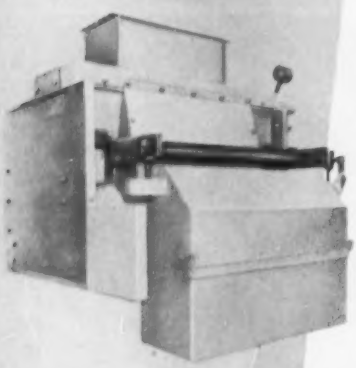
LEFT: Blocks are fitted into T-iron ceiling. **RIGHT:** Vinyl-emulsion finish is applied to complete job.

proportioning costs up?

GGG-38



You can use any number of these Richardson units plus others—coupled with a Richardson Remote Stop Counter Panel—to create an automatic proportioning system for your plant or mill.



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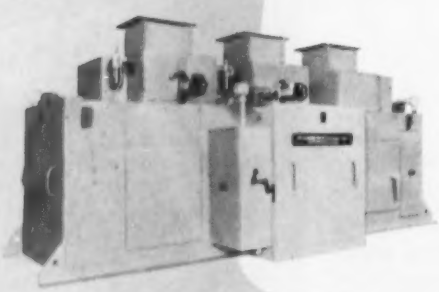

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Ole Sage Episode

WHO SHOULD HANDLE FOREMAN TRAINING? — AND HOW?

IVAN C. MILLER
Associate Editor, "Food Engineering"

HARDLY were the dishes cleared at the following session of the Guff & Gripers, when Batt Bulwark, works manager of Mull & Mull, sarcastically volunteered—

"It's mighty easy to settle at least the first of today's points on foreman training—that is, *who's* to handle it. I say, just turn 'em over to Ole. He'll train 'em. That's his business. What d' you say?"

This aroused Ed Strong, superintendent of Zenith. "Seriously, Batt—and the rest of you, too—Ole does get my vote. Results at our place have been far more than we expected since Ole got to guiding our training."

"Well that's certainly a *real* endorsement," clipped in Personnel Manager Milt Sorenson. Then he chided: "Come on, Ole—let's have your sales plug!"

This remark further spotlighted Ole, who acknowledged: "Thanks, Ed, for the build up." Then he grinned broadly. "I say 'thanks' because recognition, a pat on the back, evidence of esteem—from above or below—are truly the highest wages one can receive."

"Except," grunted Bat, "that they won't buy beefsteak."

"You're right there, Batt. The body can't feed on them. But they sure are life-blood to the spirit. You might poetically say that they're treasures that can be hoarded but never lost and never spent.

Ole paused to light his pipe then continued: "Frankly, I'm glad to hear Ed's commendation, not only as something valued by me, but also because it launches us into today's discussion. But if you'll be patient I'd like to detour a moment from the main route to say a word about Ed."

Only Batt withheld approval. "Just one of Ole's tricks to confuse us," he grumbled.

"I'm sure all of you—even Batt—will agree with me," resumed Ole, "that Ed has the qualities of a leader."

"Agreed," cut in Batt. Then Ole went on: "Ed, as all of you must have observed is hesitant with criticism, cautious with discipline, and generous with praise when deserved. His willing encouragement stimulates others to increased accomplishments.

"One of his greatest leadership assets is the fact that he's an accomplished listener—just one of several reasons why he merits everyone's confidence."

Eyes shifted to Ed, who was staring down, unseeing, at a spot on the tablecloth. Then Ole pressed on: "In fact, I could point out *various* leadership strengths *for each* of you—"

"Including *me*?" invited Batt quizically.

"Definitely," assured Ole. "But I'm not going to mention even one of yours—for surer than shaving you'll disagree and start an argument."

When the laughs subsided, Ole was saying: "All of you have leadership qualities, some more than others. However, I don't think any of you were born 'natural leaders', though all of you likely started with the *capacity* for leadership. Anyhow, if I'm right in my thinking, the extent to which you've got leadership qualities today, reflects the extent you have received, absorbed, and applied the training to which you've been exposed.

"In short, whether or not we approve, or whether or not we're willing, training goes on everywhere and all of the time for all of us."

Batt was blunt. "I came up the hard way," he emphasized. "And all I can remember is forever being told, 'Do it, or else!' "

"By now," mused Batt, much less aggressive than usual, "I should know enough to keep my mouth shut. But here goes again: If I ever had any training in leadership, or in the development of leadership qualities—training of any kind, for that matter—I never knew it. You see," he said bluntly, "I came up the hard way. And all I can remember is forever being told, 'Do it, or else!'."

"Oh," said Ole, "You've had training, all right, Batt. And you've made good use of it, too." Then he generalized. "From birth, every human (with the exception of some of the mentally deficient) undergoes training every waking hour of every day. All the influences that shape

MORE THAN HE KNEW . . .

In the course of hitting the high points, Ole demonstrates that even Batt had received a considerable round of 'training'—though he wasn't aware of it. . . . But today, management must put a sharper eye on the initial human selection

one's knowledge—ideas, beliefs, and the like—comprise training. For that matter, so also is every physical act that flexes the muscles.

"And regretable though it is, the results of the training can be negative as well as positive—our criminal population being the proof."

"As usual," blurted Batt, "Ole has again got me muddled. Now I see it, and now I don't. Sure, I know he's trying to get over something about training. But danged if I know what."

"Well, often in your own plant, Batt," persisted Ole, "you must have noticed the great extent to which employee morale—and consequently volume and quality of production of a group or department—has been influenced by the leadership qualities of its foreman."

At this, Batt blossomed. "Now you've really said something I can understand and go along with," he boomed.

"Then, I hope," resumed Ole, "that you'll also agree that present capabilities of your foremen are the result of the impact of all the influences—in a broad sense, training—that have had a bearing on their natural capacity to learn and to lead.

"And here's what I've been working up to: Since training is the result of all daily contacts and influences, it is actually beyond the range of any one consultant, or any other single individual, to fully administer."

"What then can a consultant do—I mean, *what* does he do?" asked Batt.

"A fair question," admitted Ole. "And here's the answer, as I see it: He can do much the same job as does a good personnel manager, provided his hands aren't tied by management protocol. That is, he can help upper levels of management recognize deficiencies in its foremen, both as a group and as individuals—sell management on strengthening the first line—and then guide that management toward adequate training to cure foremen weaknesses.

"Management," he went on, "should be encouraged to adopt the objective of lifting each foreman up to his maximum efficiency. And also the brass should be influenced to prepare those men, who prove sufficiently capable, for further advancement.

"Can't you, just for once, say it in A, B, C's?" pleaded Batt.

"I'd like to, Batt," replied Ole. "But development of foremen to acquire management skill is not an exact science. You'll remember from our last meeting the very great variation in subject matter that foremen are taught. And likewise numerous and varied are the methods of presenting the training. Every known teaching method is being applied, it appears. And some unheard-of new methods are being born."

"I've never been a teacher," injected Batt. "But it seems to me teaching is teaching, and that's that."

"Then let's bypass teaching," chuckled Ole, "and instead talk about training and learning. Now, among the many learning channels employed in foreman training, here are a few that are most commonly and effectively applied:

First, there's learning by doing. Then, instruction of one individual by another. Also, participation-learning in group activities or training programs.

"These latter—the group activities—may be run either inside the company, or outside, such as in civic affairs. And may I urge that for most satisfactory results you keep these groups small. That is, not over 15 members in size.

"As for who's best qualified to conduct each type, it's the next boss up who should instruct the individual foremen. And the training in groups may be administered directly by management-selected experts, either within or outside the company. Also, this may include textbook study and correspondence courses.

"Your foremen should be stimulated to engage in civic activities. But whether they do or not depends on their own endeavors. The other method, learning by doing, can be effected through job rotation, or similar means. Key man for directing it is the foreman's boss.

Batt now broke in. "If one of my foremen is on his toes, believe me, I know it," he boasted. "And if he isn't, I know that, too. Only thing is that, when he's not, I don't exactly know what to do—except to crack down, meaning . . . well, I guess personally I don't want any part of training. That's more for specialists, like Ole.

"But let me tell you," he plunged on, "In my time I've had many a lunkhead foreman work for me—guys with skulls that Ole 'r nobody else could pound any sense into, no matter what kind, or how much, training you poured in. But as for firing 'em, I was always afraid I'd be stuck with worse ones in their place."

"Batt, you've beat me to the draw," admitted Ole. "However, one fact should always be kept in mind—that the individual develops himself. He has to be more than capable—he must also have a real desire to develop. This is where management influence has to be effective.

"Unfortunately, it's too often the case that the foreman aimed at lacks either, or both, capability and desire to develop. In the years of experience you fellows have had, you must have seen much evidence of that. So you'll agree that top brass has a weighty responsibility to meet *before foreman training*. That means along the lines of more careful and effective selection of both new employees and new foremen.

Milt Sorenson was looking at his watch. "Employee selection," he spoke up, "is something I've been mighty interested in our getting into. For the next meeting, yes? I don't hear any nays, so it's agreed."

Readers are invited to contribute their comments on any points raised in our Ole Sage Episodes. Just address Editor, "Food Engineering," McGraw-Hill Pub. Co., 330 W. 42nd St., New York City 36.

(Turn to page 103 for Ole's Notebook)

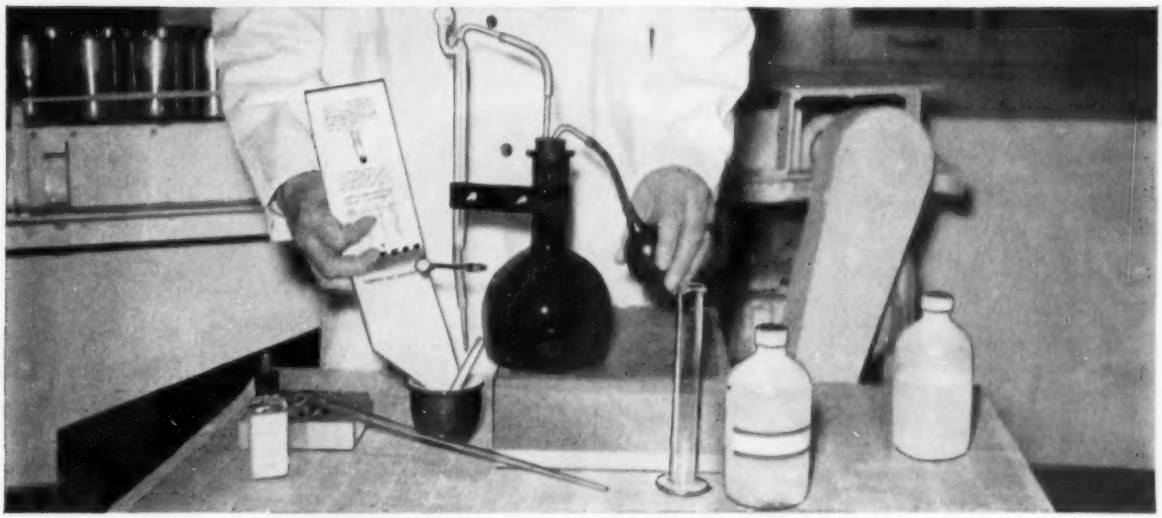
UP THE HARD WAY came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1956 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*

Morton Salt Company's new million dollar laboratory at Woodstock, Illinois, is at the service of the food industry to help you solve any problem relating to salt. For example, here's ...

How Morton helped kraut packers make a better product



Here's a sauerkraut packer using the plastic enclosed end point testing colors in Morton's waterproof booklet to determine the percent of salt in a kraut sample.

Salting sauerkraut correctly—to produce uniform high quality—presents two important problems to kraut packers.

1 Kraut packers (like other canners and food packers) have the problem of using the right amount of salt. The Morton Salt Company helped solve this problem with an easy-to-use booklet that shows you how to test kraut for salt content.

Morton's waterproof booklet, "Better Sauerkraut through effective use of salt," comes with plastic enclosed end point testing colors, and contains complete data on when and how to test salt content.

2 Kraut packers also face the problem of using the right type of salt for better flavor control. Morton helped solve this problem with Morton '999' Salt.

'999' is a high purity, low cost salt which contains 99.9% clean, pure sodium chloride; exceptionally low in the objectionable trace metals, copper and iron. '999' is an evaporated granulated salt that won't break up in shipment and will dissolve uniformly in an average time of about six minutes (not too fast or too slow). Morton '999' Salt has a practically constant weight per volume and is easily and efficiently dispensed by hand or machine.

How Morton can help you make a better product

Chances are Morton can help you turn out a better product for less money if you use salt for canning, packing or processing any food product. For Morton makes many grades of salt for the food industry, and only Morton has 9 strategically located plants to serve you. We offer fast delivery from a bag to a trainload at favorable prices and freight, *anywhere* in the country.

What's more, one of Morton's Food Technologists can assist you with on-the-spot help with any problem you have pertaining to salt. And he's backed by the services of chemists and salt scientists at Morton's ultra-modern research laboratory.

☐ Please send me your free booklet,* "Better Sauerkraut through effective use of salt."

☐ I am not a kraut packer but would like more information on how Morton can help me:

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Title_____

Company_____

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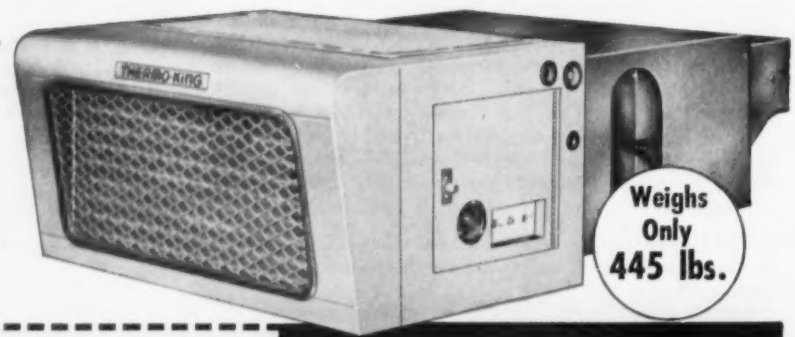

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From Ole's Notebook

Supervising for Morale

A key finding by the U. of Michigan's Institute of Social Research studies has been that there is a marked relationship between an employee's productivity and job satisfaction, on the one hand and, on the other, the kind of supervision he receives.

Highest productivity and highest morale have consistently been found to result from *employee-centered* supervision, as opposed to supervision of the *production-centered* type.

All this would seem to indicate that companies cannot realistically look to specific types of morale-building programs for any complete solution to the problem of building a productive, satisfied work force.

For, in large part, morale has its origin not in any particular "program" but right on the job—in the relationship between supervisor and worker.

And if morale and productivity are finally to be linked together, management must find ways to select, train, and develop more supervisors capable of putting the principles of good human relations into practice.

Tip on Working Conditions

Too much or too little heat, bad lighting, and noise adversely affect a man's physical organism, hence directly influence his productivity. And this influence can be especially broad in a manufacturing plant.

The poor working conditions can be particularly demoralizing when the employees take them to be evidence that the management isn't doing its part, isn't participating fully in the company group, and isn't recognizing the problems and needs of the personnel.—*"Human Relations in Small Industry," McGraw-Hill Book Co.*

Shouldn't "Live Apart"

The supervisor who fails to "identify" with his employees becomes psychologically distant from them.

This makes him incapable of seeing and dealing with problems as the employees see them. Hence, he's unable to arrive at decisions that are mutually satisfactory.

Accordingly, this supervisor is also unable to help middle and top management get a proper understanding of the workers' views in order to reach proper policy decisions.—*"Motivation: The Core of Management," a publication of the AMA*

Maintenance on the Rise

The future will see an increasing need for well-educated and well-trained maintenance men. We may have the beginnings of an entirely new type of work force by 1960, wherein maintenance men will eventually outnumber production workers.

Moreover, these men will need to be not only more skilled but better educated. Age should no longer be an important factor when the main requirement becomes an ability to use one's brain along with one's skill.

Just as most airplane accidents today are due to human rather than mechanical failings, human fallibility must be recognized in the utilization of automatic machinery. Personnel planning will require entirely different techniques for selection, placement, and training.—*"Personnel", American Management Assn.*

4-Way Executive Training

Executives should be well trained in four major areas. How to manage (1) things, (2) situations, (3) people, and (4) themselves.

If properly taught they will constantly reassess their strength, weaknesses, values, habits, and goals in order to stay afloat.

If top management is mature and concerned, it will help the executives to balance themselves.—*Dr. Ralph T. Collins, Psychiatrist, Eastmen Kodak Co., before AMA Midwinter Personnel Conference.*

Personnel Directing Vital

A personnel executive should either be a member of the board of directors, planning board, executive or management committee, or make his influence felt through a superior who is a member.

The personnel department must be integrated into corporate planning, or a channel must be provided for the effective flow of personnel advice and recommendations.

In order to perform his functions adequately, the personnel specialist should be an executive among executives, preferably a company officer. He not only exists to assist the other executives, but also to be accepted as one of them. And he should, therefore, be willing to accept the responsibility for his own decisions and the results.

He must be the yeast that ferments changes in employee relations, the sparkplug that initiates needed improvements.

While he does not himself establish personnel policies, he certainly develops, recommends, criticizes, interprets, and polices the policies which should only be accepted through group deliberation.—*E. H. VanGelden, Vice-President, Schenley Distilleries, in "Personnel", a publication of the AMA*

Need for Understudies

Many men who have been lauded as great business leaders have, nevertheless, failed in this important aspect—They were so busy operating their companies or so jealous of their positions that they didn't take the time to train men to carry on after they were gone.

And so, many of the once-great concerns thus involved have now disappeared because of this short-sighted attitude of their owners or managers. —*Roy C. Ingersoll, Chairman of Board and President, Borg-Warner Corp.*

In Behalf of Progress . . .

Opportunities and Problems Posed by Bright Outlook

At mid-year, the progress outlook for the food industry is quite bright. It offers new opportunity. Yet some of the very factors that paint the rosy picture also present problems.

General business is at a high level, despite slackening in sales of automobiles and some other products, and the decline in farm incomes.

For the first quarter of this year, gross national product was at the annual rate of $399 billion. This represented a gain of $1.7 billion over the fourth quarter of 1955.

Food and beverage companies chalked up a 13% gain in net income in the first three months of 1956, compared with the same period a year ago. And the profit margin improved a little.

Business men not only are counting on good business through 1956, but in 1957 and beyond. This is revealed in the final results of a capital expenditure survey made by the McGraw-Hill Department of Economics, which lead to these significant observations:

Considering planned expenditures and other factors, there are more props under the general level of prosperity than ever before. And with present long-range plans for research, new products, and capital spending, it is entirely possible that the years 1955 and '56 will turn out to have been only the start of another great surge in business activity.

U.S. business plans to spend almost $39 billion for new plants and equipment this year, a 30% increase over 1955. What's more, a very high level of expenditures is on the boards for 1957, 1958, and 1959.

Manufacturers plan to increase capacity 8% this year, another 18% in 1957-59. They also have important plans for new products, and expect 11% of 1959 sales to be in items not made in 1955.

Significant, too, is the fact that business already has plans to increase research and development expenditures 33% by 1959.

These all-industry trends spell out continued high-level incomes. So consumers can buy more processed foods. They also can enrich their market baskets with choice-quality items. And they can buy plenty of products with more value added by manufacture—those easy-to-prepare time-savers.

In short, there is an opportunity and challenge for still more rapid progress in our field.

But the expansion in other industries will mean more competition for labor, and especially for skilled and technical manpower. The trend is inflationary, too. So significant wage increases are certain, spelling higher costs down the line for our field.

Also, the new non-food products will be competing with "luxury" food buying for available consumer dollars. Which puts a premium on new-product development by food manufacturers.

This, of course, is only part of the story. Competition among food companies will be tougher, too. This is indicated by their expansion, modernization, and research plans.

More than $800 million will be laid on the line for capital goods this year in our industry. This involves a 19% increase over 1955 for food factories and a 6% decrease for beverage plants, the combination amounting to a 12% gain.

These data indicate an expansion in capacity of 5% for 1955-56, and 11% for 1957-59.

Sixty-three percent of expenditures by food factories will be for equipment, 37% for construction. For beverages, the corresponding figures are 73 and 27%. Obviously a lion's share of the money is going into modernization for higher efficiency.

Yet it is significant that increases in physical sales volume of 22% and 33%, respectively, are anticipated for food and beverages for the 1955-59 period.

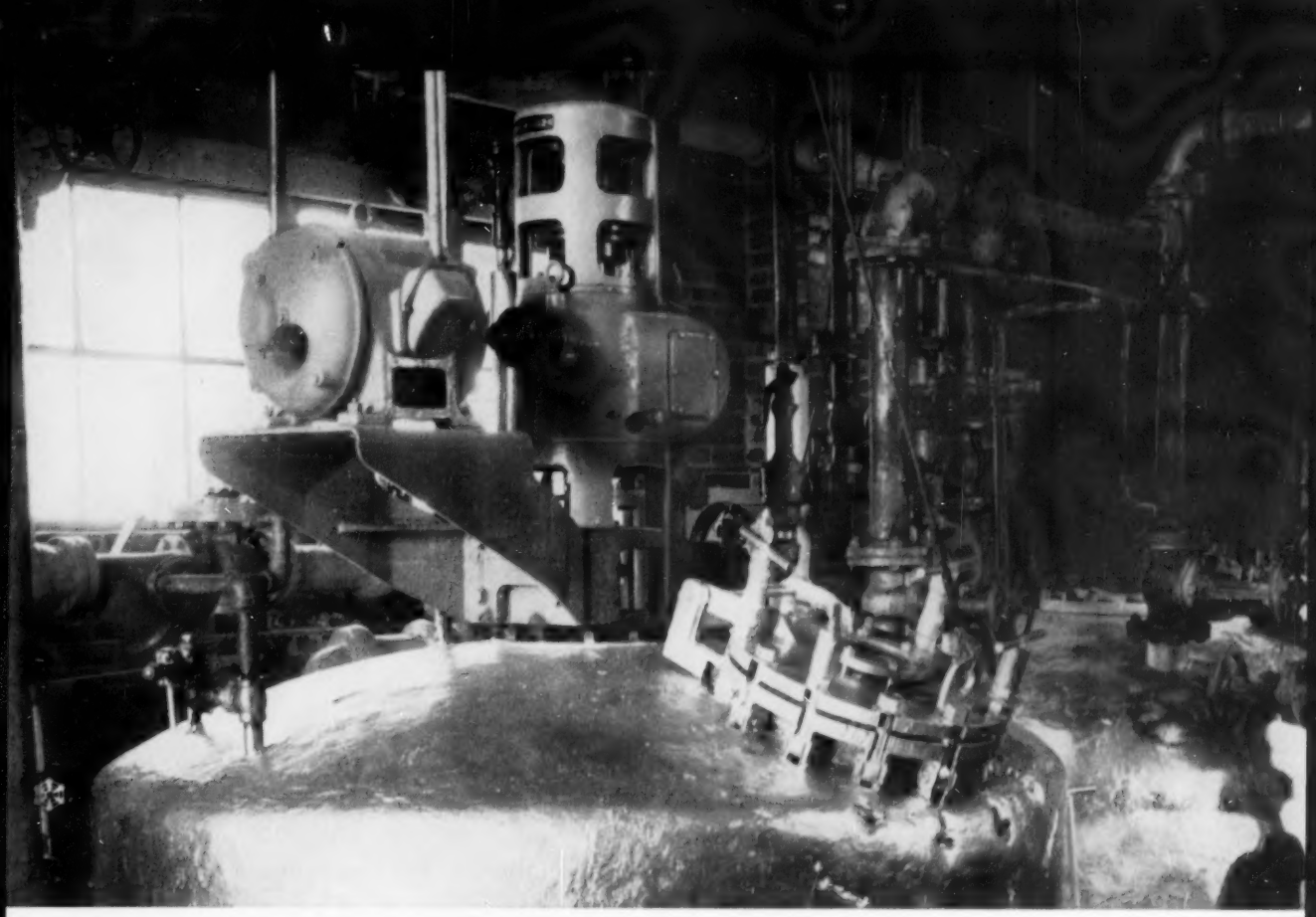
Note this, too. Eight percent of sales in 1959 are expected to involve new products not made in 1955. And companies report that 22% of capital spending this year is going for new products facilities.

It is not surprising, then, that expenditure for research and development, much of it for new products, is expected to hit $84.7 million in 1959—an increase of 27% over 1955.

To add a dramatic specific to these general trend data, let's take the pace-setting example of the H. J. Heinz Co. Establishing a new record for net income of better than $234 million last year, this firm is in the midst of the greatest plant construction program in its 87-year history of continuous progress.

Since World War II, Heinz has committed $50 million to expansion and modernization, and plans call for expenditure of a like amount in the next five years. This program embraces Great Britain, Australia, and Canada, as well as this country.

Pace setters like The House of Heinz are out to get a still larger share of the business. And they very likely will take some of your customers if you don't keep pace with their progress.



How to keep **25,000 lbs. of product** *from burning up*

How can you assure even cooking, without burning, in batches as big as 25,000 lbs.? Here's how one company does it with a LIGHTNIN Mixer:

Sethness Products Co., Chicago, makes high-quality caramel from sugar, in the big pressure kettle you see here. The sugar must be stirred constantly, while temperature rises and holds steady above 250°F for several hours, then quickly drops to 200°F. Good temperature control is vital.

What the mixer does

To meet the critical stirring requirements, Sethness uses a Series "E" LIGHTNIN Mixer with stainless shaft and turbines. The mixer creates a rapid, uniform flow of sugar throughout the kettle. It keeps temperature equalized, so sugar caramelizes uniformly. And it provides high coefficient of heat transfer, so temperature changes in the vessel jacket are transmitted quickly and evenly through the batch.

You can meet the most exacting fluid mixing requirements—in any batch size, any tank or container—with LIGHTNIN Mixers. You get the *one* correct mixing pattern that exactly meets your needs—selected scientifically from many hundreds of standard power-speed combinations. Results are guaranteed, unconditionally.

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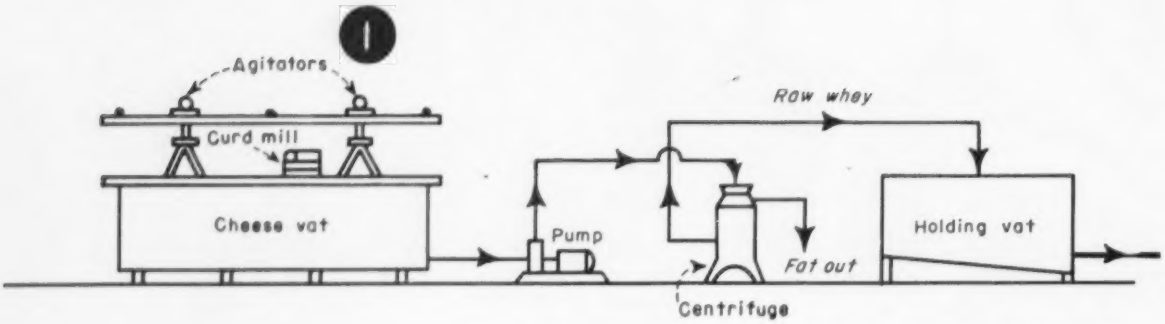


Making Whey Solids—The New Technique

Western Condensing does it with special advanced equipment and a widespread network of feeder plants and tank trucks

CENTRALIZED production . . . continuous flow . . . specially designed equipment—all play a key part in boosting whey solids production at Western Condensing Co., Appleton, Wis.

Here, high-quality products are turned out in a spic-and-span plant at the rate of 30,000-40,000 lb. of product per day.

To meet this performance, an adequate raw material supply must be assured. This is done by means of a unique preparation-and-transportation system that enables collection of raw whey from individual cheese makers scattered around the state.

In cheese vats at these plants, liquid whey is separated from curd—point 1 on accompanying flowsheet. It is then centrifuged to remove residual fat and is stored in milk tanks.

The raw material is either cooled to 36-38F. for direct tank-truck shipment, or it is pre-concentrated to 35-40% solids in an adjacent factory (owned and operated by Western Condensing) for later delivery to the main processing center.

Arriving at the central drying plant, chilled whey is pumped directly into sanitary, milk-type storage tanks—point 2.

High-Efficiency Evaporator

Then pumps force the whey through tubular heat exchangers—point 3—at a 20,000-lb.-per-hr. rate. Preheated to 220F., the liquid continues to a four-effect evaporator—point 4—where it is concentrated, in stages, from 6 to about 30% solids. This evaporator was specifically designed and built by the company for the job.

The partially-finished product is collected in holding tanks—point 5—along with condensed whey from the feeder plants. Next, it passes through a vertical, tubular heat exchanger. And a final, single-effect evaporator (also company made) concentrates product to about 50% solids (6).

Condensed liquid delivers to agitator-equipped cooling tanks (7), where vital crystallization of lactose (milk sugar) starts.

Drying and Conversion in Single Stage

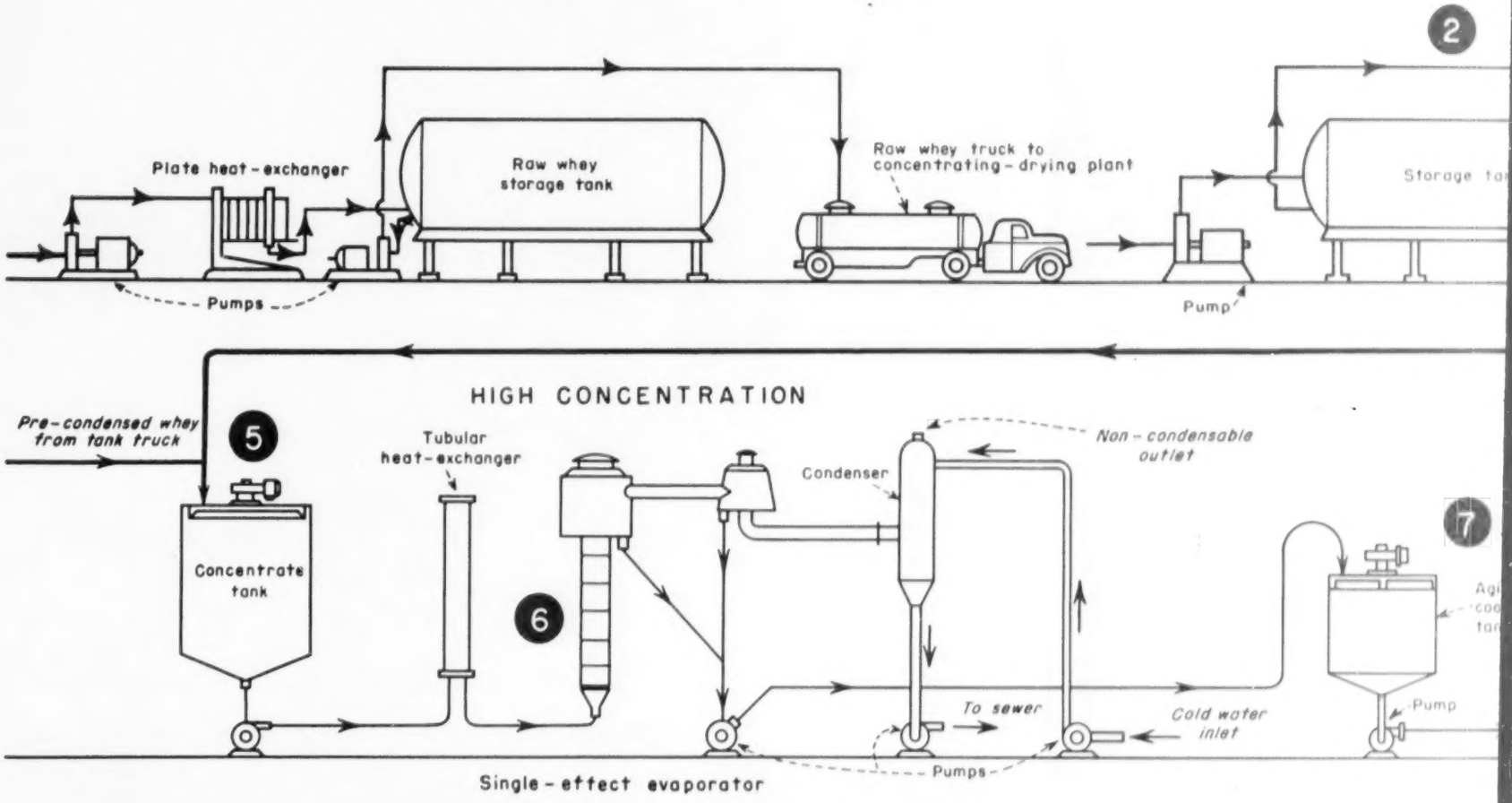
Following this step, concentrate is ready for stabilization and drying. For this purpose, a spray dryer is used. It simultaneously dries product to about 15% moisture content and converts lactose sugar into the stable monohydrate form (8).

Final drying to 4-5% moisture is achieved as solids pass through a vibrating dryer.

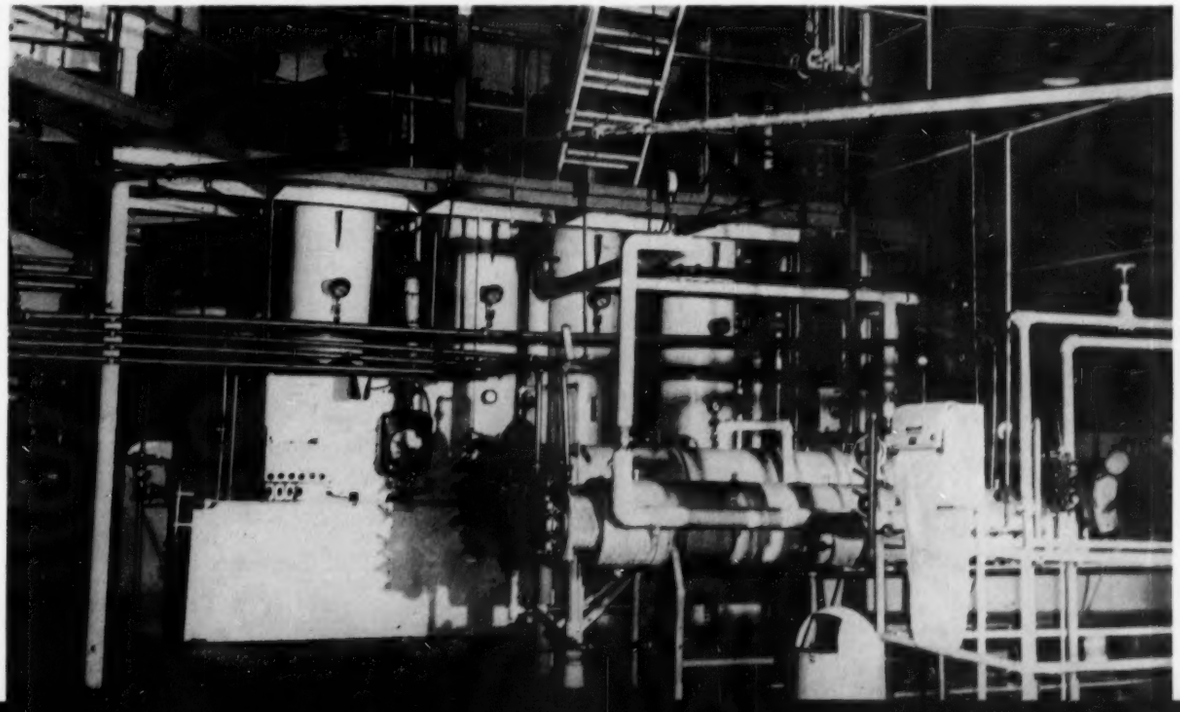
A break-up fan reduces any small lumps to fine powder and blasts solids to a cyclone, which delivers powder to a vibrating sifter—point 9. From here, coarse product is either packaged in polyethylene-lined bags and fiberboard drums, or is further ground and mixed with additional ingredients.

In the latter case, coarse product is reduced in a pulverizer. It can then be bagged or sent to a horizontal ribbon mixer for blending with non-fat milk and/or refined soya solids. Latter mixtures produce modified whey products for special food uses.

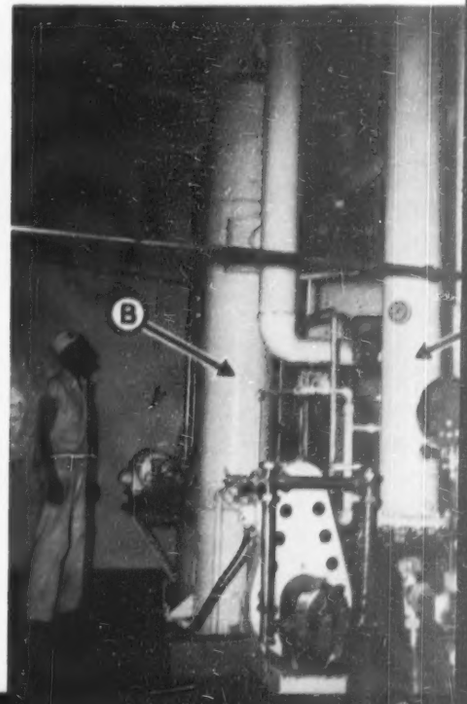
FOR OUR SPECIAL FE REPORT on quality development, plus latest applications of these products, see "Skillful Processing Broadens Food Uses for Modern Whey Solids," p. 74.



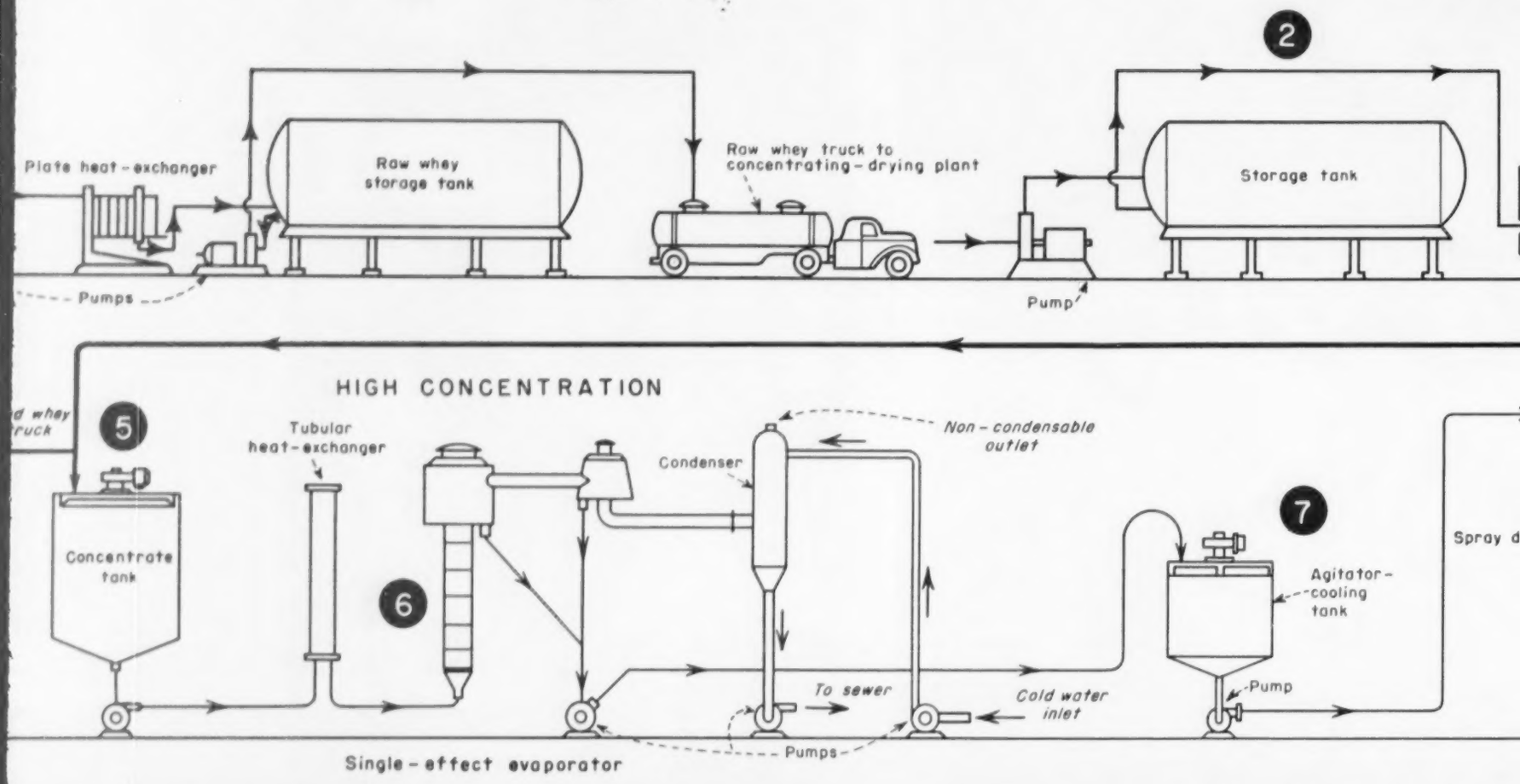
4 **KEY UNIT** in plant is company-built four effect evaporator (center). It boosts whey solids content to 30% at rate of 20,000 lb./hr. Dual heat exchanger (foreground) preheats liquid to 220F.



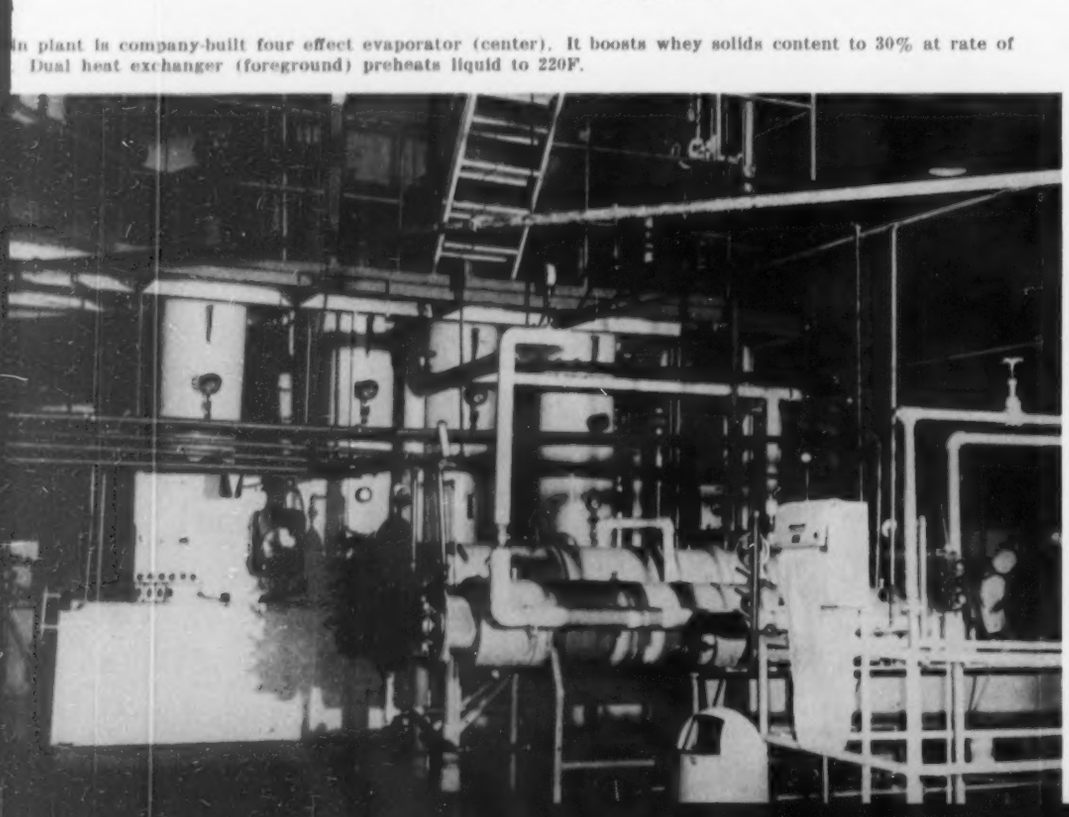
6 **FINAL CONCENTRATION** takes place in sing evaporator (A). Vertical preheater is at (B).



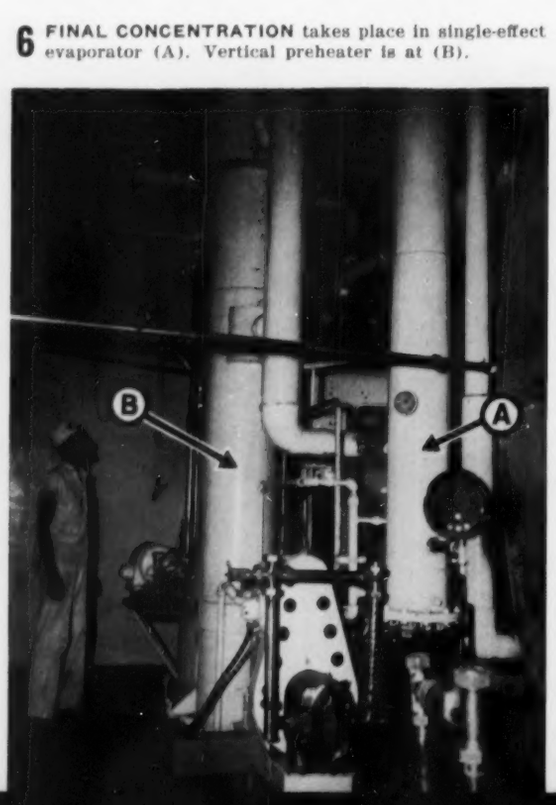
TRANSPORTING FE PICTURE FLOWSHEET NO. 89



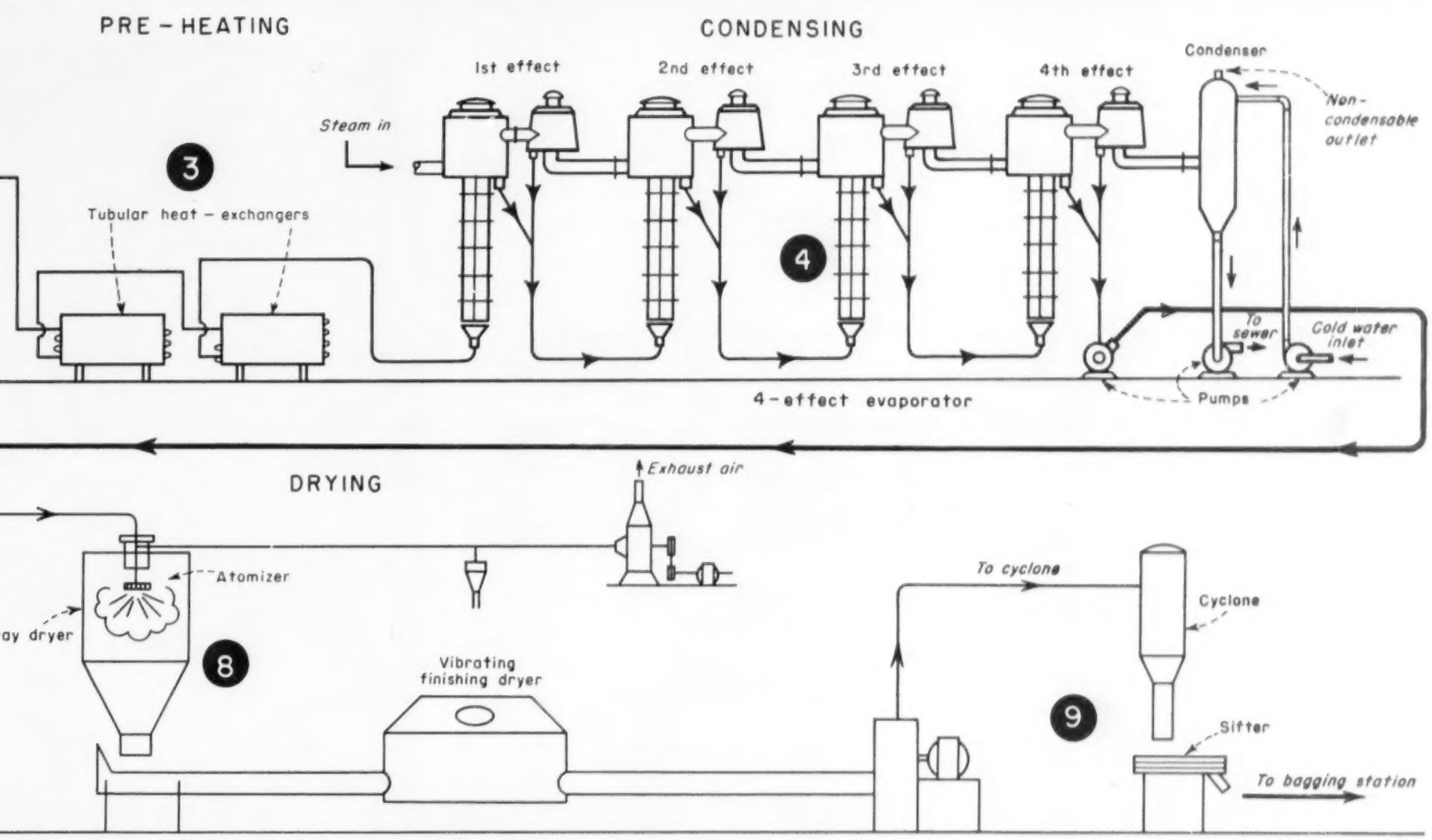
n plant is company-built four effect evaporator (center). It boosts whey solids content to 30% at rate of Dual heat exchanger (foreground) preheats liquid to 220F.



6 FINAL CONCENTRATION takes place in single-effect evaporator (A). Vertical preheater is at (B).

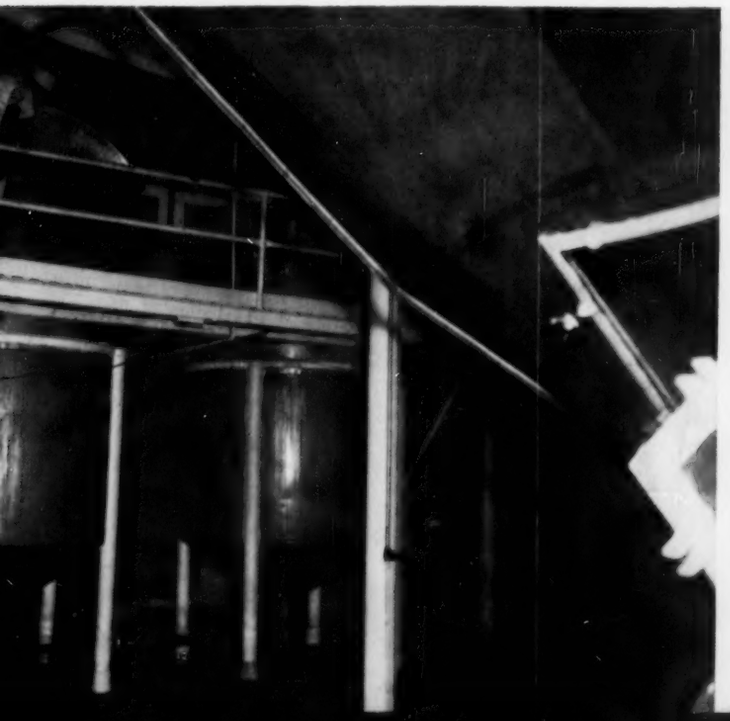


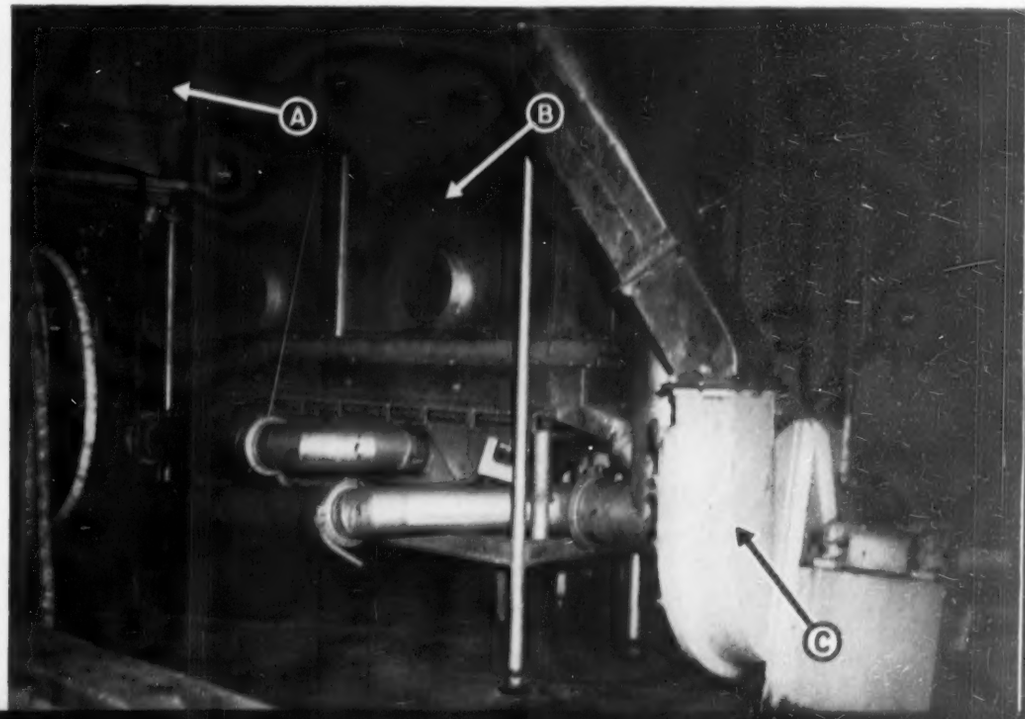
7 AGITAT trickles



ITATOR TANKS start important lactose crystallization step. Cool water ckles down over tank sides to cool condensed product.

8 SPRAY DRYER (A) completes product stabilization as it dries whey solids to 15% moisture. Vibratory dryer (B) reduces product to 5% moisture. And blower (C) breaks small lumps.





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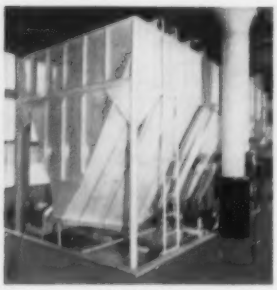
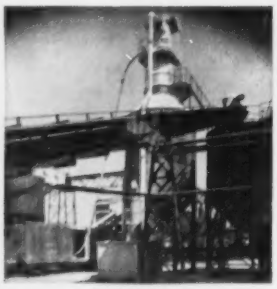


BAKERY

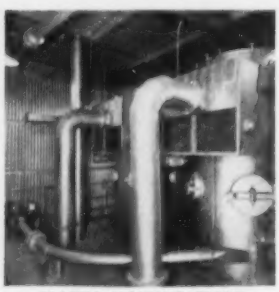
FEED MILL



PAPER MILL

BREWERY

TEXTILE PLANT

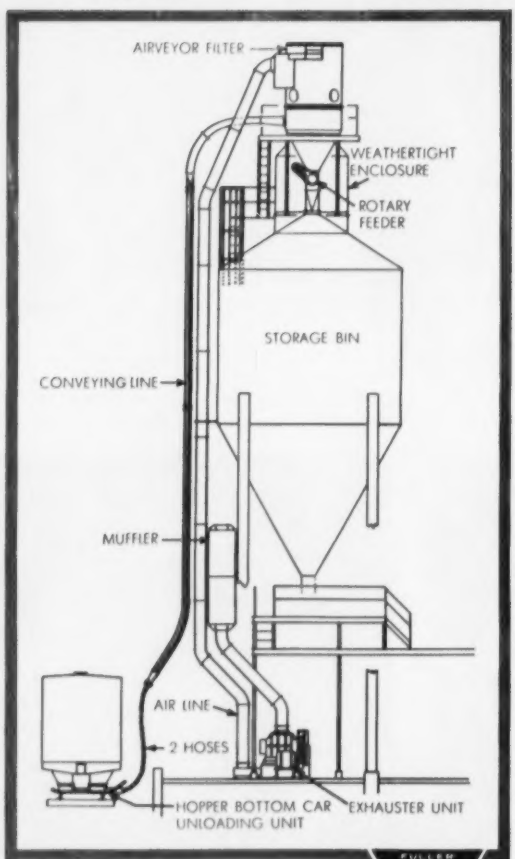


PLASTIC MOLDING PLANT

Facts are hard to beat and it's a fact that bulk materials-moving—from cars or trucks to storage . . . and on to process—is a vital part of your operation, demanding top efficiency if your production is to be maintained or increased. The system(s) you are now using may be taking a costly annual toll in lost time, lost production and excessive maintenance. Take a good, close look and you may be surprised to find that your materials handling operation is now, or is becoming a bottleneck—the slowest ship in your production convoy.

If you handle raw chemicals, bakers' ingredients, brewers' grains or other materials of similar consistency, you'll be interested in the facts about Airveyor, the Fuller system that has put air to work in hundreds of installations across the country and Canada.

Fuller experience in harnessing air to move dry materials spans more than a quarter of a century and covers the widest variety of applications. Take the first step toward putting this experience to work for you by letting us make a study of your operation. It costs nothing and may well light the way to greater production at less cost.



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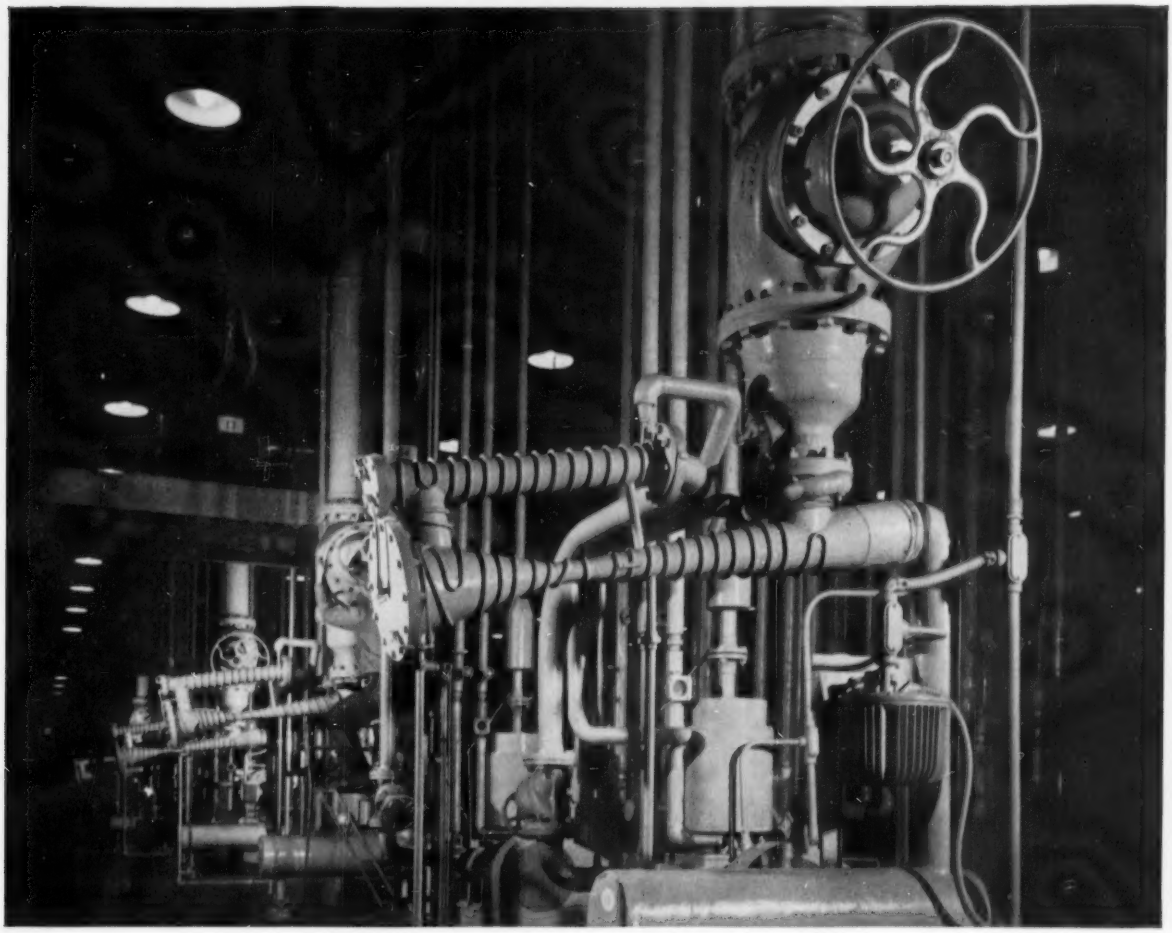

These Crane valves holding 25 microns absolute pressure after 2 years on vacuum service

The Case History—Valves frequently are the most critical points in a vacuum system. But that's not the case with this large Southern light metals refiner.

This plant reports no trouble or expense over a 2-year period in maintaining a vacuum of less than 25 microns absolute for its distillation process.

The tight-holding valves installed about 2 years ago on the lines from vacuum pumps shown above are Crane No. 1611 diaphragm pattern. These 12-in. packless iron body valves are used about once daily.

They've allowed no in-leakage at the seat, bonnet-joint, or through the diaphragm. No maintenance whatever has been given the valves since installed. They operate easily and look good for such service indefinitely.

This high efficiency performance is mainly due to Crane separate disc and diaphragm design. The diaphragm used as a bonnet seal only is not subject to destructive crushing. Conventional type disc and body seat provide a metal-to-Neoprene seating that's ideal for vacuum and hard-to-hold fluids.

Moderately priced, Crane diaphragm valves deserve your consideration for many ordinary services, as well as sludges, slurries and corrosive fluids. They are made in a wide variety of body and trim materials, in ½ to 12 in. sizes.

Ask your local Crane Representative about them, or write to address below for literature.

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WHAT'S NEWS AT BRISTOL . . .

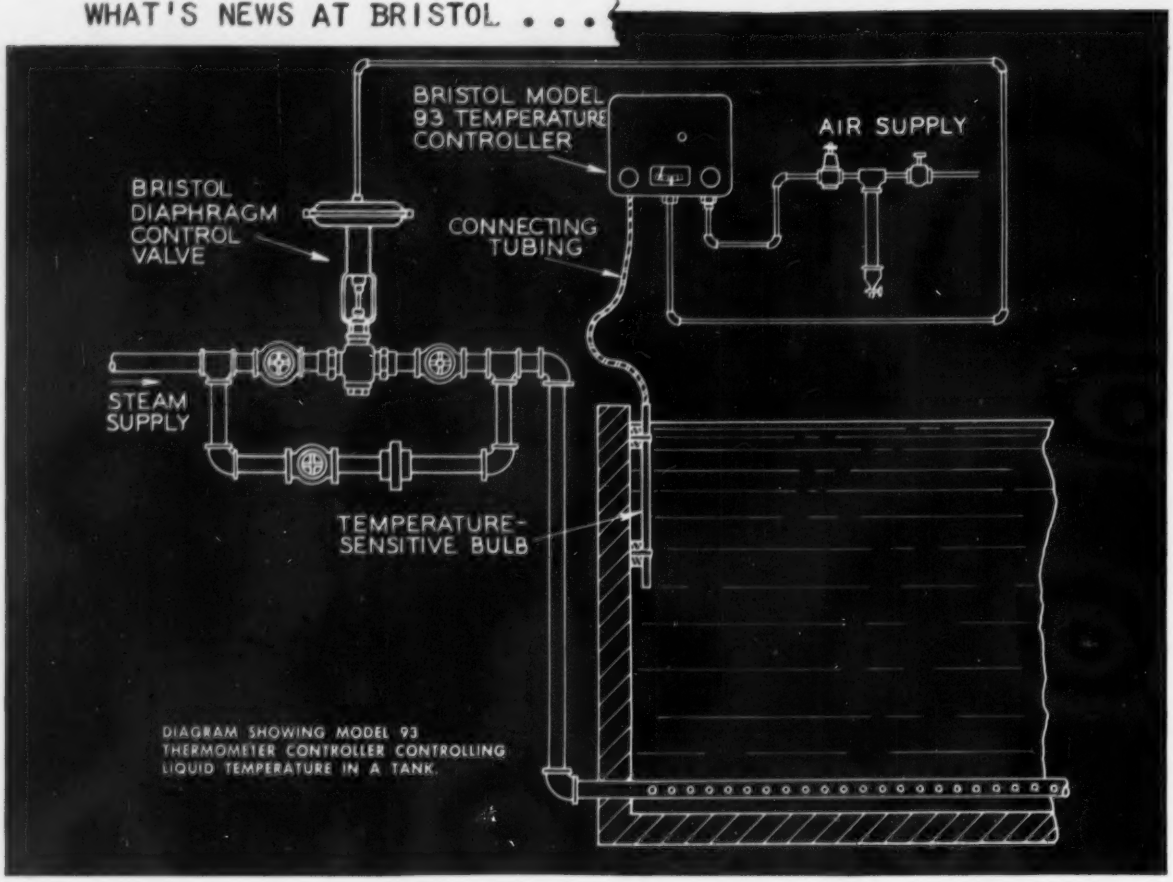
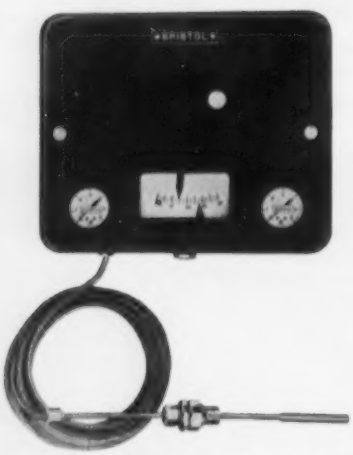


DIAGRAM SHOWING MODEL 93 THERMOMETER CONTROLLER CONTROLLING LIQUID TEMPERATURE IN A TANK.



MODEL 93 Thermometer Controller. Temperature Controllers are available in a variety of ranges, both Centigrade and Fahrenheit.

Where variables must be controlled but not necessarily recorded

If you have a control application where chart records are unnecessary or already provided for, then Bristol's Model 93 Free-Vane Air-Operated Controller is the instrument for you.

This small, compact instrument features the same precision measuring element used in all Bristol recording and controlling instruments, and the same high-sensitivity, frictionless Free-Vane control system used in all Bristol air-operated controllers.

Set-point adjustable to any value in the instrument range simply by turning pointer to desired value. Throttling range adjustable from ¼% to 12% by the user.

Model 93 Controllers are offered for:

1. **Temperature** – from −125F to +1000F.
2. **Pressure** – from 0 to 10,000 psi.
3. **Liquid level** – in open or closed vessels.
4. **Flow** – of steam, gas, air or other liquids through pipes.

The Model 93 Air-Operated Controllers are described in complete detail in bulletin A115. Write for a free copy today. Also ask for our control valve catalogs. The Bristol Company, 115 Bristol Road, Waterbury 20, Conn. 5.25

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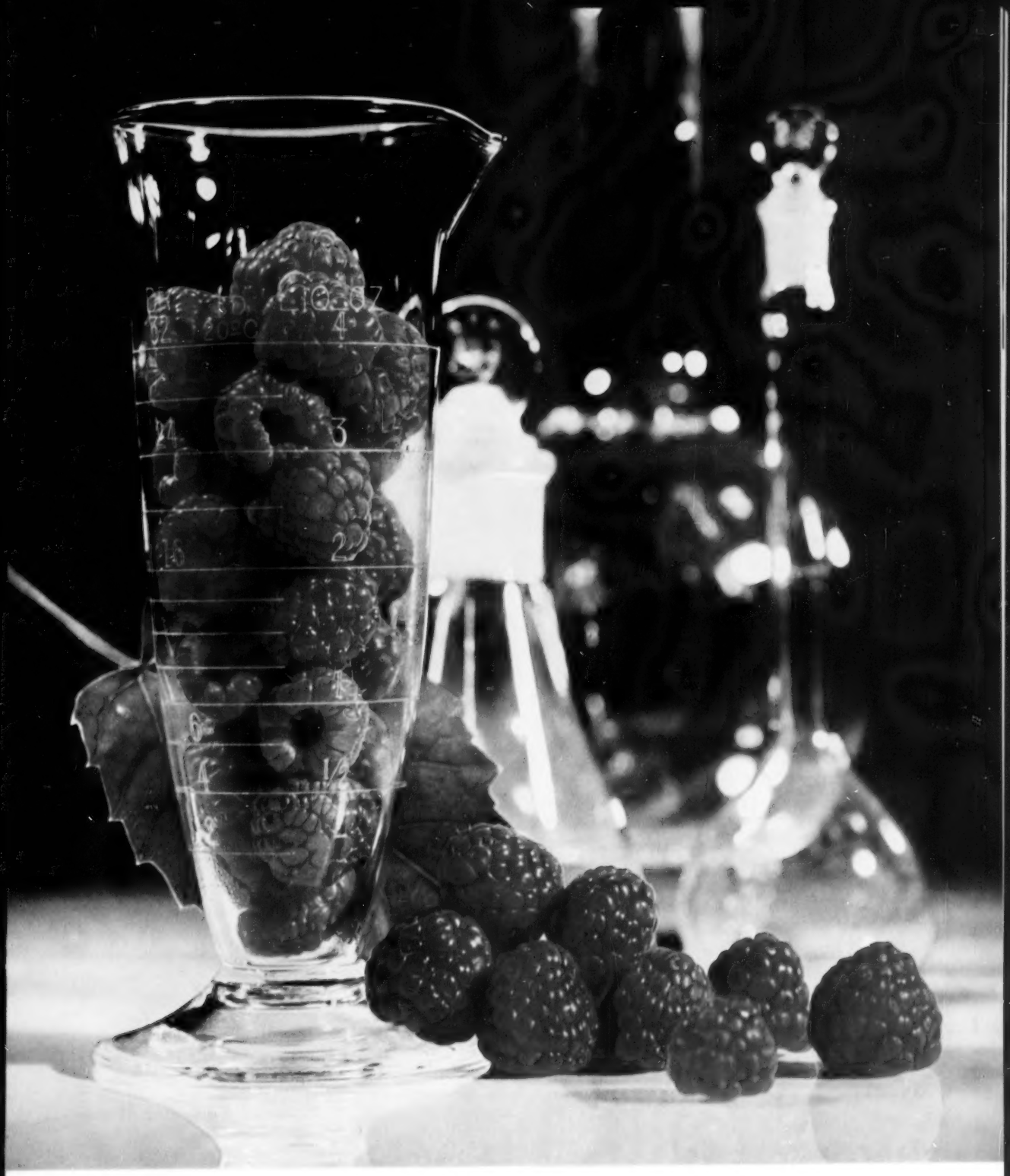

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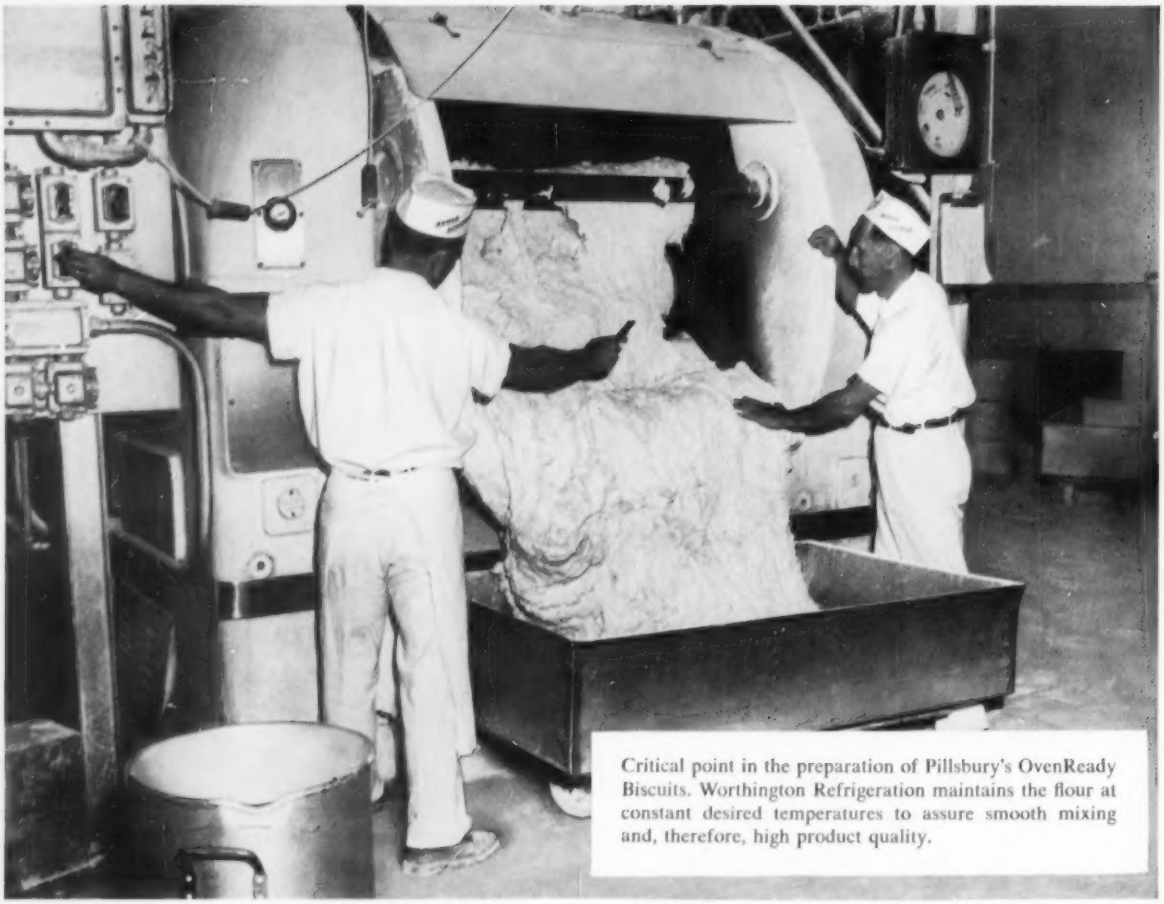


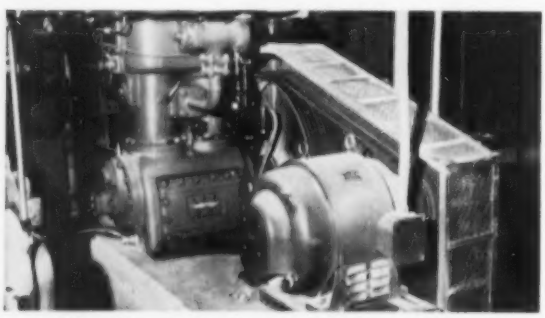
Critical point in the preparation of Pillsbury's OvenReady Biscuits. Worthington Refrigeration maintains the flour at constant desired temperatures to assure smooth mixing and, therefore, high product quality.

Biscuit dough: quality control demands temperature control

In the preparation of OvenReady Biscuits, Pillsbury Mills finds that high quality calls for careful control of temperature in all stages of preparation.

Flour must be carefully chilled for smooth, even mixing. The dough must be kept at exactly the right temperature for preparation and packaging. And during storage and shipment, the finished product is always well refrigerated.

For a major share of this important quality-control job, Pillsbury depends on Worthington refrigeration equipment.



A Worthington 2-cycle refrigeration compressor in Pillsbury's Downingtown, Pa., plant.

Three Refrigerated Foods plants—at Los Angeles, Downingtown, Pa., and Louisville—are equipped with Worthington ammonia compressors. These units feature automatic capacity control which assures economical operation.

In addition to ammonia compressors, the Los Angeles and Downingtown plants use Worthington brine pumps, product coolers and air handling units.

At the Louisville plant, a Worthington evaporative condenser cuts water consumption of the system as much as 90%.

In any food plant quality control starts with temperature control. If you have a QC problem that requires refrigeration, get in touch with your nearest Worthington District Office or distributor. Or write to Section A6104, Worthington Corporation, Harrison, N. J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont. A-6104

WORTHINGTON

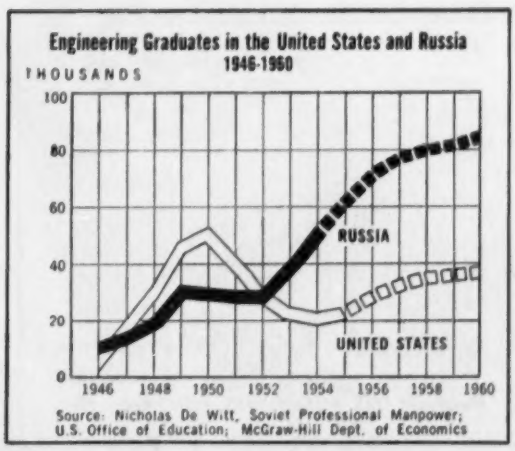
THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

Are We Losing the Race with Russia?

THERE is new confidence in the Kremlin. One key reason is expressed in a recent boast of Communist Party Secretary Khrushchev: **"The capitalists always regard our people as being backward, but today we have more engineers and more supporting engineering technical personnel than any capitalist country."** He promised that this lead would be widened and that communism would be victorious without war.

This boast cannot be dismissed as communist propaganda. Admiral Lewis L. Strauss, chairman of the U. S. Atomic Energy Commission, has warned: **"In five years our lead in the training of scientists and engineers may be wiped out, and in ten years we could be hopelessly outstripped. Unless immediate steps are taken to correct it, a situation, already dangerous, within less than a decade could become disastrous."**

This second editorial in a series on the shortage of scientists and engineers is designed to explore as carefully as possible the facts and the implications of the new emphasis on technical training in the Soviet Union. It draws heavily from the authoritative book *Soviet Professional Manpower,* prepared for the National Academy of Sciences and the National Research Council by Nicholas DeWitt of the Russian Research Center of Harvard and released recently by the National Science Foundation.



Trend Is Against Us

If the Soviet Union already has a lead in technical manpower, it is not very great. Both the United States and Russia now have around a million scientists and engineers. About a third of the Russian engineers were trained on inferior pre-1935 standards. **It's the trend — shown in the chart — that is alarming.**

Over the last five years we have turned out only 142,000 engineers, compared to an estimated 216,000 in Russia. In 1955 our output was around 23,000 compared to their 63,000. Over the next five years our projected output is 153,000, against at least 400,000 in Russia. There will be an additional 150,000 or more in the satellites and Red China.

In Russia, 30% of the college students are in engineering, compared to 8% here. Another 30% or more take degrees in natural sciences. Moreover, unlike ourselves, the Russians are

ploughing back a large proportion of their science graduates into teaching, which implies a rapid buildup in the future.

Quality As Well As Quantity

It would be foolhardy to assume that these new Russian graduates are inferior to ours in the quality of their technical training. They start out with much more intensive mathematical and scientific preparation at the high school level. They study harder and longer in college, with more laboratory work and more practical training. Their courses and textbooks seem to be as thorough as ours. Even though the Russian graduates may be overspecialized, they get results.

These results have been striking. The Russians developed both A-bombs and H-bombs faster than we expected, and it's not certain that they had to rely much on espionage. They pushed ahead of us for a while in jet fighter design, and they showed up with a fleet of long-range bombers well ahead of schedule. They are crowding us on nuclear power, electronics and automation. There are grave fears that they have established a lead in the vital field of military rockets.

The goal of Soviet scientific manpower policy includes not only weapon supremacy but also leadership of the neutral and uncommitted areas of Asia, Africa and the Middle East. The Soviet leaders may be bluffing in their offers to export capital, but they are preparing to export Russian scientific and technical know-how in a big way.

How They Do It

The Russians are determined to win the race for scientific supremacy, and they do not count the cost. **They pay their scientists and engineers salaries that seem fantastic when compared with other Soviet incomes.**

Senior professors, research scientists and top engineers are a major segment of the Russian elite. Their incomes are frequently six to ten times the average industrial wage. (In the U. S. six to ten times the average industrial wage would be $25,000 to $40,000 a year.) Housing and other privileges are correspondingly lavish. While preaching equality, the Soviets use capitalistic incentives far more boldly than we do. Indeed, practicing engineers and scientists have been complaining about the exalted status of professors and top research people, and salary scales are now being adjusted to give greater emphasis to practical results.

The Russians are also generous in their aids to education. Tuition has just been made free at all levels. Undergraduates receive 200 to 500 rubles a month and graduate students 800 rubles (about equal to an industrial wage) to cover living expenses. The biggest stipends go to science and engineering students. College students are deferred from military service, and engineers and scientists often enjoy continued deferment even after graduation.

Finally, the Soviet leaders can channel engineers and scientists — and all other human and material resources — into any area they choose. And the areas the Soviet leaders choose are predominantly those that contribute to military or political objectives, rather than to a better life for consumers.

What's Our Answer?

We are certainly not going to adopt Soviet methods. We do not want scientific robots, but free men, able to understand and add to our democratic heritage. At the same time, our world leadership in technology — and perhaps even our survival as a nation — will be threatened if we allow ourselves to lag far behind Russia in the training of scientists and engineers. Ways to keep the United States in the race will be discussed in a later editorial in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

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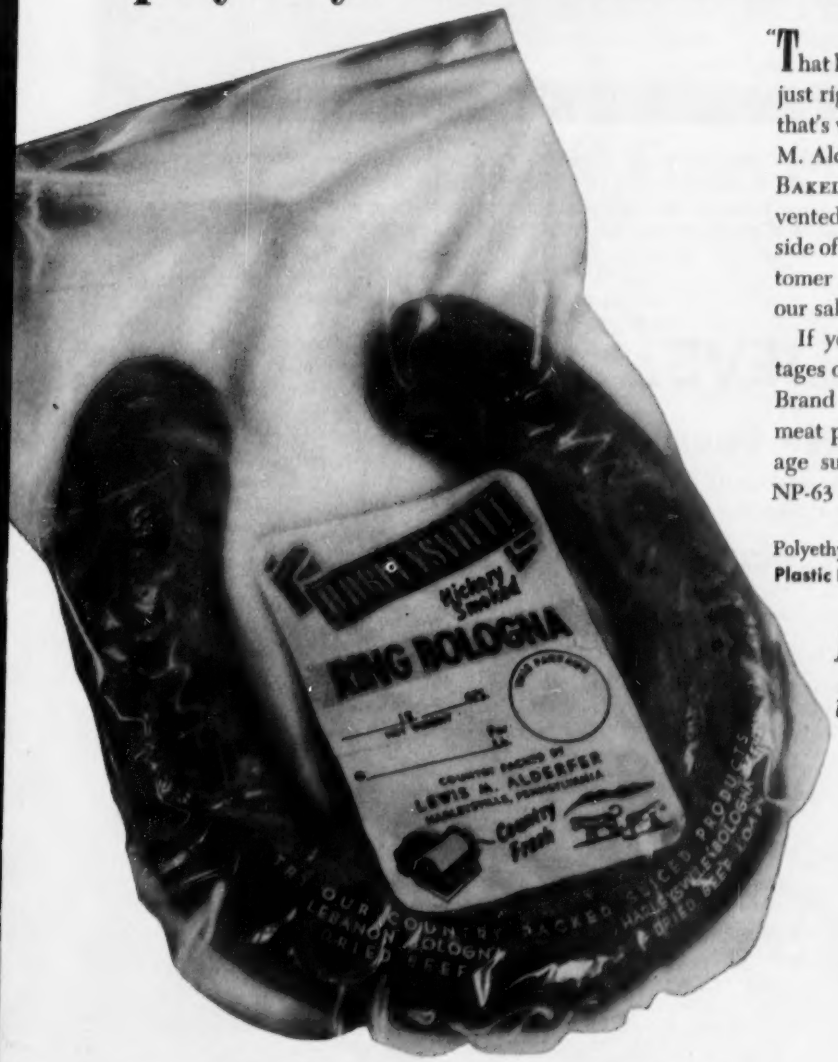
"polyethylene lets the bologna 'breathe'"



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If you haven't considered *all* the advantages of packaging in film made of BAKELITE Brand Polyethylene for a wide variety of meat products, have a chat with your package supplier. It will pay. Or write Dept. NP-63 for our "Processed Foods" booklet.

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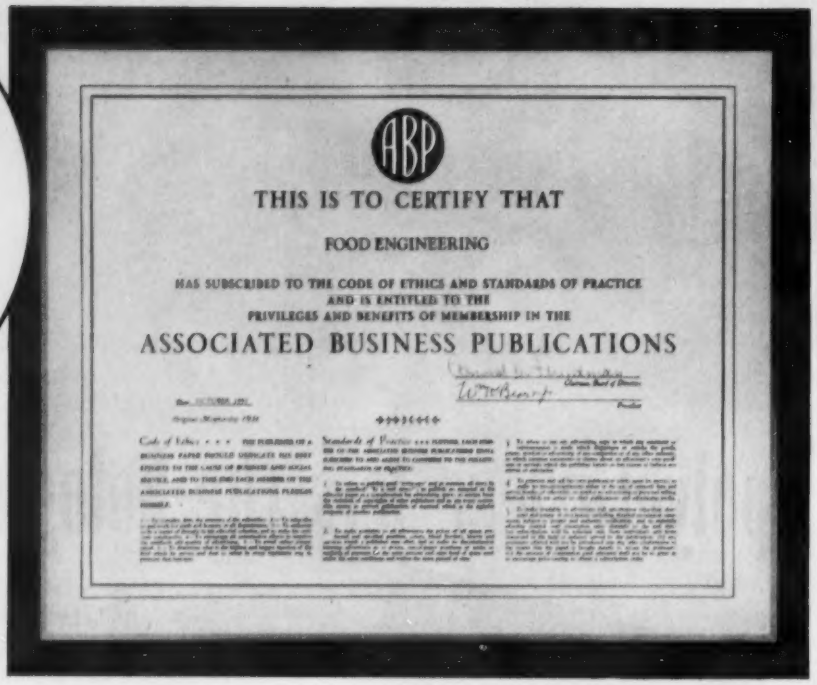
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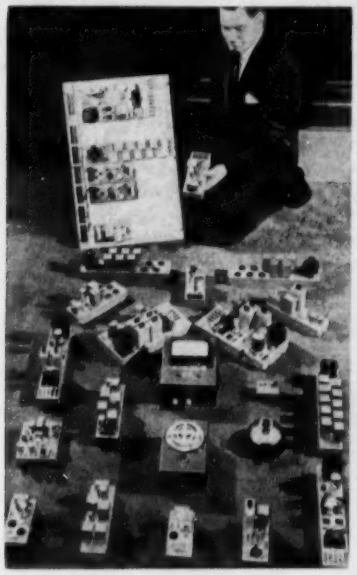
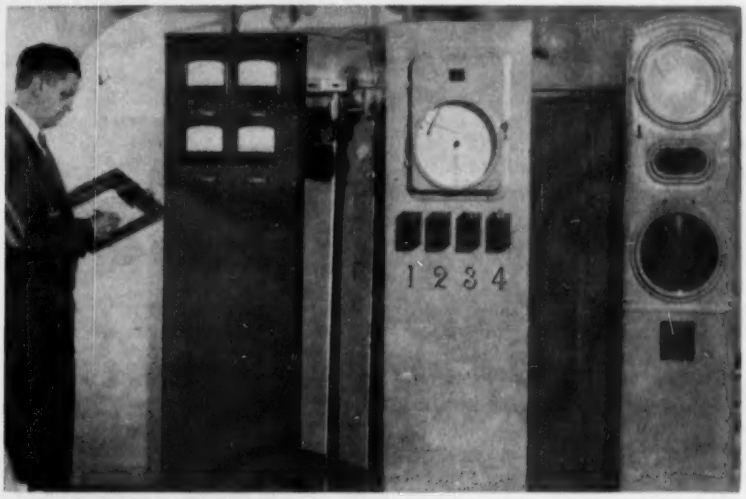




ELECTRONIC BUILDING BLOCKS (left) are components of new remote-control push-button systems. Installation (above) measures and reports on water level of storage tanks, simultaneously indicating rate of flow.

Electronic "Brains" From Modular Units

From this series of 21 standard "building blocks", you can now select various electronic control systems for regulating pushbutton operations from remote points.

Already in use in oil refineries, petrochemical plants, and water-pumping stations, these modular blocks (Sparton) are simply hooked up by plug-in units. They can be expanded or regrouped by semi-specialists, and use a single standard communications channel that handles hundreds of control and supervisory functions with major economies.

Assemblies provide five standard control systems: (1) Automatic alarm, (2) remote metering, (3) discreet control, (4) proportional control, and (5) transmission systems. Units can turn any type of process on or off, regulate its sequence, apply proportionate control, or supply step and selective controls.

Numerous process variables may be measured and transmitted to remote control centers—pressure, vacuum, temperature, rate of flow, material level, speed, current, position, load, and count.

Two main classes of systems are available, completely automatic and centrally controlled. In the latter, a single operator checks the condition of a whole process by glancing at an integrated control panel incorporating meters, indicator lights, or a variety of alarm signals.

Units control processes operated electrically, mechanically, pneumatically, or hydraulically. Sensitivity permits regulation of fractional-horsepower motors as well as 1,000-hp. machines. Furthermore, control systems can now be made more compact.

All adjustments and calibrations are built into the blocks. Routine maintenance checks (three times a year) can be made by plant electricians. They use a test meter and log the readings for comparison with fixed performance standards.

At present, the building-block technique offers up to 125 channels of control available in a progression of 10, 25, 50, 100, and 125 channel systems. They can integrate memory circuits and are sufficiently flexible to incorporate computers or equipment activated by punched card or tape.—*Sparks-Withington Co., Jackson, Mich.*

Circle 119A on Reader Service Card

Truck-Refrigeration Unit Ups Delivery Efficiency

Automatic temperature control and defrost, light weight, and low maintenance are advantages reported for new hydraulic truck-refrigeration units. Designed for insulated truck bodies and operated by vehicle's engine, they are termed particularly suited to wholesale delivery of frozen and perishable foods.

Units (Model "H") are made in two styles—straight hydraulic drive and combination hydraulic and stand-by electric-motor drive. They will be available for all size straight-truck

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—front of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

bodies and for all temperature requirements.

Spare horsepower developed by the truck engine actuates the hydraulic pump, which either belt-driven by the crankshaft or through power take-off, operates the hydraulic motor. Latter runs at constant speed whether truck engine is idling or fully accelerated, thus there is no variation in refrigeration capacity.

Refrigeration is accomplished by forced-convection cooling. Air in the truck is drawn through a cooling coil where heat is removed. Cool air is then blown back into the truck body and onto the cargo. It moves downward, under and around the lading, and again flows through the cooling coil.—*U. S. Thermo Control Co., 44 S. 12th St., Minneapolis 3.*

Circle 119B on Reader Service Card

Efficiency, Safety Cited For New Fork Trucks

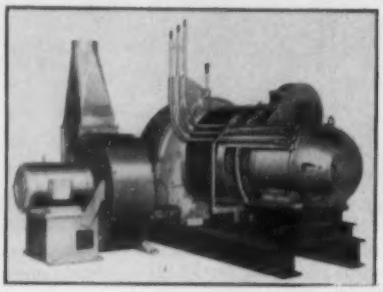
Advanced design of this line of fork trucks boosts efficiency, safety, speed, and durability. Units are available in gasoline, LP-gas, diesel, and electric-powered models in capacities up to 10,000 lb.

Fully automatic torque transmission permits precise "inching" under either full load or no-load conditions. And it provides the power necessary for simultaneous operation of lifting and tilting attachments. Controls are located for right-hand operation, which leaves left-hand free for steering.

A lowered cowl, new uprights, and off-center positioning of operator offer increased visibility and safety. The seat, which adjusts for driver comfort, is recessed to keep his head below the overall channel height. Furthermore, all gas trucks have been approved for abnormally high fire-hazard areas.

Self-adjusting hydraulic brakes keep proper clearance between lining and drum, thus eliminate need for periodic adjustment of brake shoes. In addition to hydraulic brakes, all electric units have a "deadman control" that sets mechanical wheel brakes when operator leaves the truck.—*Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15.*

Circle 120A on Reader Service Card



Versatile Dual-Power Mill Provides Jet Conveying

Ear corn, small grain, hay, roughages, and other hard-to-grind items are typical feeds for this high-capacity mill.

A dual-power unit (Blue Streak), it has two motors—one for the fan, the other for the mill. This offers jet conveying in any direction. Other advantages: Rugged construction, heavy-duty permanent magnets, replaceable liners for blower, large double-row bearings, and heavy rotor shaft.—*Prater Pulverizer Co., 1515 S. 55th Court, Chicago.*

Circle 120B on Reader Service Card

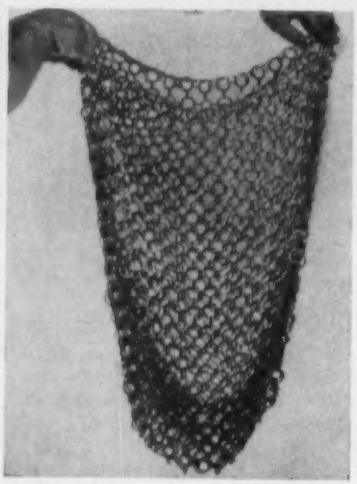
Corrosion, Wear Resisted By Special Roller Chain

Industry-wide application in critical transmission drives is seen for a new roller chain, specially processed for excellent resistance to corrosion and staining. Furthermore, it offers high-tensile strength and low coefficient of friction.

Called Electrolized Roller Chain, its properties are attributed to a unique two-step treatment consisting first of stress relief. Then a hard, non-alloy is deposited on significant surfaces.

As a result, the metal resists corrosive action of food acids and salts, while minimized wear ups chain life. Chain is made in all Standard American Roller Chain sizes.—*Atlas Chain & Mfg. Co., W. Pittston, Pa.*

Circle 120C on Reader Service Card



For Greater Efficiency: Stainless Cooking Net

Easier cleaning and longer service life are reported advantages of this new stainless-steel cooking net. Capacity is 50-70 lb.

It's closed by a draw chain long enough to hang outside the tank, which permits its removal without reaching into hot water. The fully collapsible net is simply cleaned by hosing.—*Dirigo Sales Corp., 210 Milk St., Boston 9.*

Circle 120D on Reader Service Card

Meter Controls Moisture Of Granular Products

Operating on the capacitance-bridge principle, a new instrument continuously measures and controls moisture content of granular materials for more efficient drying, cooling, or tempering. Typical applications: Corn products, whole grains, rolled oats, and commercial mashes.

Called Rogers Moisture-Controller, it employs a test cell consisting of

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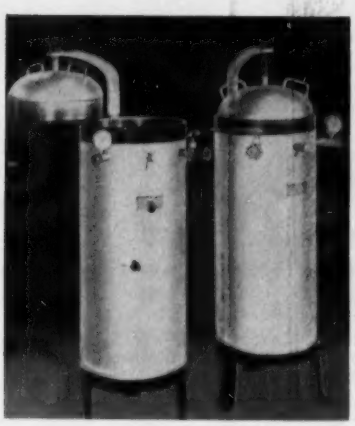
five parallel horizontal augers that push material between electrode plates. Walls are tapered to ease flow and prevent excess pressure. Unit is powered by a ½-hp. motor.

Developed by Quaker Oats Co., the recorder-controller is marketed by *Robertshaw-Fulton Controls Co., Fielden Instrument Div., 2920 N. 4th St., Philadelphia.*

Circle 120E on Reader Service Card



Dry-Ice Converter Meets Smaller CO_2 Needs

A convenient source of carbon dioxide for the smaller plant is this vertical dry-ice converter.

Loaded from the top at waist-height, it takes three 50-lb. cakes of dry ice. The full-opening cover is spun open or closed on threads, also swivels around on a hanger.

Although unit does not require power for its operation, a hot-water spray ring is available when quick melting is desired immediately after loading. Maker also offers converters with capacities up to 1,000 lb. for vertical or horizontal installation.—*Dry Ice Converter Corp., Tulsa, Okla.*

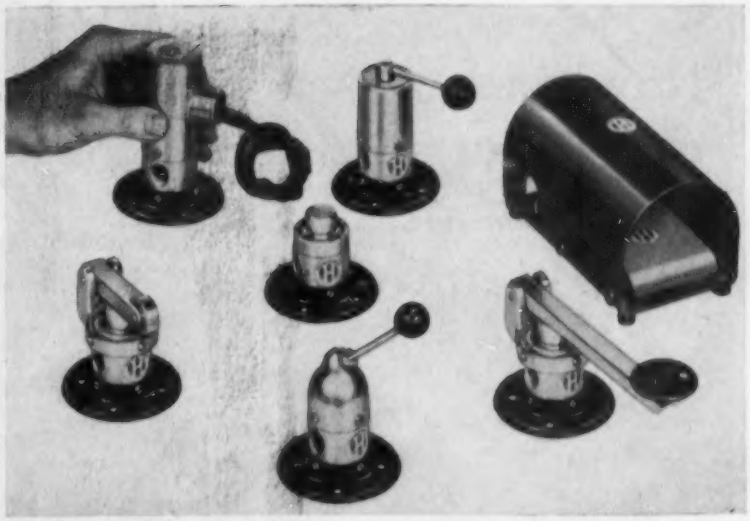
Circle 121A on Reader Service Card

New Pumps Accommodate Varying Head, Volume

Here are centrifugal pumps designed for a wider-than-usual range of pressures and capacities without serious loss of efficiency. Special design accommodates fluctuations in head or volume.

Known as Model BL, they come in five sizes—2 to 6 in. Factory-lubricated ball bearings and mechanical seals cut maintenance.—*Gardner-Denver Co., Quincy, Ill.*

Circle 121B on Reader Service Card



New Quick-Open Valves Have Many Applications

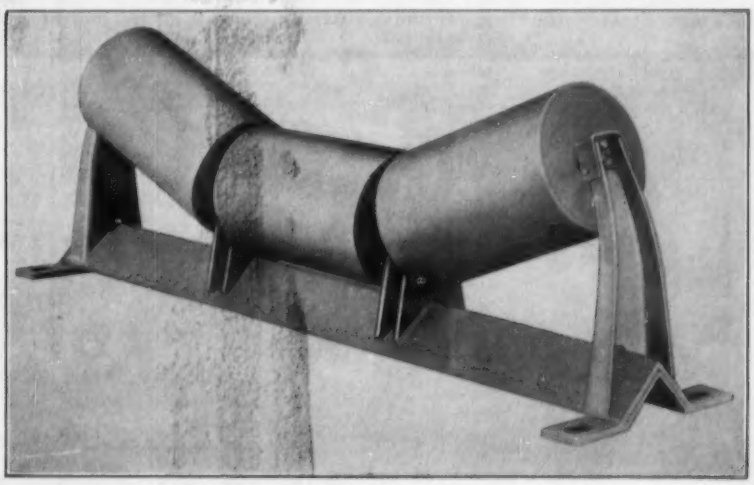
Here are seven models of a new line of valves for automatic or manual control of air, water, oil, or Freon. Types: Solenoid, cam-operated, palm-button, fingertip, foot-operated, and hand-lever. Having ¼ in. ports, their operating range is from −40 to 225F. and to 125 psi.

Known as "Quick-Dump", they use a basic valve body (normally open or closed) to which simple triggering devices may be added. Valve action, working with the pressure of air or liquid instead of against it, is effected by light touch. Shutoff is positive and cycling is reported to be rapid.

Simplified construction eliminates internal packing, springs, pistons, and metal-to-metal contact—thus minimizing wear. Units have corrosion-resistant finishes and diaphragms of "Buna N" rubber.

In the solenoid model, a new type of double coil offers increased thrust. It is triggered by a momentary electric impulse, hence lack of prolonged current eliminates overheating.—*Humphrey Products, Kalamazoo, Mich.*

Circle 121C on Reader Service Card



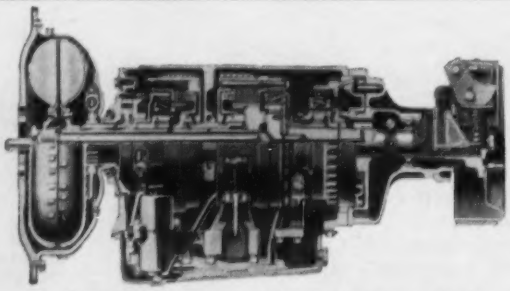
Many Advantages Cited for New Belt Idler

Offering savings in first cost and operating power are belt-conveyor idlers termed new from base to ball bearings.

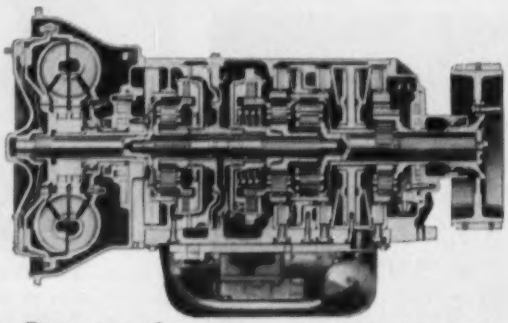
Called "Series 50", they are available in 7 belt widths from 14-36 in. in both a greasable type (a one-shot lubrication system serves all three rolls at once) and a factory-sealed type, which requires no further greasing.

Now there's a great automatic transmission for whichever Chevy truck you choose

Famous Chevrolet *Hydra-Matic*, or all-new *Powermatic*, provides easy, safe automatic driving that's tailored for your truck!



Hydra-Matic—optional in Series 3000 and 4000 models at extra cost—brings new ease to tough jobs, cuts hauling time and maintenance expense.



Powermatic—optional in Series 5000-10000 models at extra cost—assures the easiest, safest big-truck operation ever known! It's a Chevrolet "first."

Pick *any* Chevrolet truck . . . and you'll find there's a modern automatic transmission to make your hauling easier, safer, and more profitable!

If your choice is a Series 3000 or 4000 model, there's ***Hydra-Matic***. This modern automatic transmission not only gives you the ease of no-shift hauling . . . it also *saves you maintenance money* because the hydraulic coupling protects drive-line parts from shock loads. Or, if your job calls for a 5000 through 10000 Series Chevy, there's exclusive ***Powermatic***—the first automatic transmission designed especially for big trucks! Six fully automatic forward speeds and a torque converter virtually eliminate manual gear shifting on hills or in traffic! A revolutionary "retarder" assures safer down-hill hauling, less brake wear and you make better time through traffic because all shifts are "power-on" shifts!

Now *automatic driving*, available throughout the Chevrolet truck line, gives you one more reason to see your Chevy dealer soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Chevrolet truck manual transmissions are great performers, too!

To give you extra pulling power in the medium- or heavy-duty model you select, Chevrolet trucks provide big, rugged heavy-duty 4-speed Synchro-Mesh transmissions, or brand-new "New Process" 5-speed transmissions!*

**Optional at extra cost in 5000-6000 through 8000 Series models, standard in 9000-10000 Series models.*

CHEVROLET

NEW CHEVROLET TASK·FORCE TRUCKS

Anything less is an old-fashioned truck!

The idler roll consists of a smooth, uniformly thick outer shell plus a heavy-wall steel center tube. Latter is brazed to disk-shaped steel heads to form a strong, moisture-tight integral unit.

Other advantages:

Unit construction—For concentricity, heads are press-fitted into a counter-bore in shell over a journal on center tube.

Reduced deflection—Overhang is minimized by positioning bearings close to shaft supports.

Non-spreading brackets—Yoke contour on brackets and slot on shaft lock all brackets together in a rigid truss structure.

Accurate roll alignment—Steel brackets and foot straps are welded to an inverted angle base, thus there are no bolts to shear or loosen.

Better belt alignment—Slotted mounting holes permit positioning of idler to compensate for support-structure variations and allow for training of belt.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 121D on Reader Service Card

Pilot-Plant Filler Permits Small Production Runs

Handling liquids and semi-solids at 12-25 qt. per min., this filler is offered for small-scale production and pilot runs.

Unit employs straight-type nozzle (special ones optionally available) to fill containers from ¾ to 32 oz. Accessories include oil or water jackets on hopper (40-qt. capacity), horizontal or vertical agitators, and level controls.—*Hope Machine Co., 9400 State Rd., Philadelphia.*

Circle 123A on Reader Service Card

Radio Waves Guide Tractor Through Plant

This fully-loaded tractor train is making its way through the plant to the shipping room—without an operator.

Called Guide-O-Matic, it follows a route set by a guide wire strung from the ceiling, hence offers new possibilities for more economical materials handling. Unit operates without physical connection between guide wire and tractor, and moves to its destination in a steady path at any desired speed.

Controlling radio waves are transmitted over wires by signal boxes throughout the plant. Simply pressing a button calls a truck to the station from which the signal originated.

A "sniffer" box on the truck picks up the waves and its electronic brain guides the tractor. Routes may vary, with many destinations served automatically. Wire is easily strung into bays, stockrooms, and shipping rooms. Or it may be laid in a small slot in the floor.—*Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.*

Circle 123B on Reader Service Card

For Smaller Plants: Versatile Pneumatic Conveying

Pneumatic unloading and pressure conveying of dry materials are now seen economically feasible for the smaller plant with use of a new package assembly.

Known as "Airo-Flow", it consists of a 25-hp. motor, rotary positive-displacement blower and cyclone separator, blow-through air lock, inlet nozzle, flexible hose, and auxiliary piping and fittings. Piping from air-lock discharge to customer's storage bins or other points of delivery are ordered to suit installation requirements.

Unloading rates of 6-8 ton per hr. are reported on light, dry ingredients, and 10-15 ton per hr. with heavier materials. Capacity is based on having unit adjacent to unloading spot. Assumed too is a combined vertical lift and horizontal run of 75-100 ft. from feeder discharge, with not more than two 90-deg. turns in the pressure-conveying line.

And this assembly serves an additional purpose when the vacuum side is deleted. Then, ingredients from mixers or screw conveyors can be spouted directly into the air lock for pneumatic transfer throughout the plant. As a straight pressure conveying system it handles about 20,000 lb. per hr., with lift and runs as noted above. In addition to serving the

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Aluminum Foil Packaging as a Gas Barrier

Report No. 3 of a Series by Reynolds Metals Company

The impermeability of aluminum foil to gases serves a twofold purpose in protective packaging. First, the foil serves to exclude deleterious gases such as oxygen as well as odoriferous organic vapors. Second, the foil serves to retain protective inert gases such as nitrogen and carbon dioxide. To achieve these purposes, it is necessary to convert this impermeable aluminum foil into a usable gasproof package, sealed in a way that prevents gas transmission through the sealed areas.

Activated dried yeast is an excellent example of a product requiring gasproof packaging. In the presence of oxygen, this product deteriorates rapidly; yeast spores gradually die off, reducing their effectiveness as the leavening agent to a point where doughs will not rise at all. Unless protected against oxygen, activated yeast cannot survive any practical time lapse between packaging and use.

This packaging problem was solved by the Reynolds Research and Development Laboratory by gas packaging the yeast in a heat-sealed envelope consisting of a lamination of aluminum foil, paper, and Pliofilm*. This package, formed from a continuous web on automatic package forming and filling equipment, maintains an inert nitrogen atmosphere for many months. Of most importance, however, is the fact that this package containing the inert gas extends the shelf life of activated dried yeast many months.

This is only one demonstration of the gasproof property of aluminum foil and how it is used in packaging. Packages have been developed by Reynolds to hold 29 inches of vacuum for periods of time well over one year. The degree of impermeability achieved in a foil package is limited only by the particular product's requirements.

Reynolds Research facilities and experience in controlling gas transmission may be made available for your particular packaging problems by contacting your nearest Reynolds regional representative—or write to:
Reynolds Metals Company, General Sales Office, Louisville 1, Ky.

Rolls (before and after baking) prepared with activated dried yeast packaged in sealed aluminum foil envelopes and stored at a high temperature and high humidity for one month. *Pans at Left:* rolls made with yeast packaged in foil envelopes in which atmospheric oxygen was replaced with inert nitrogen. *Pans at Right:* rolls made with yeast packaged in foil envelopes containing normal atmospheric oxygen.

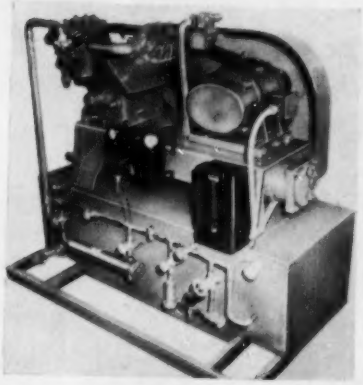
©Reynolds Metals Company, General Sales Office, Louisville 1, Ky.

*Goodyear trade-mark for its rubber hydrochloride

smaller plant, this assembly meets transfer needs within larger plants.

Unit can also be furnished with an auxiliary inlet at base of cyclone separator for both car unloading and straight pressure conveying.—*Sprout, Waldron & Co., Muncy, Pa.*

Circle 123C on Reader Service Card



Heavy-Duty Cooler Offered As Compact Package

Shop-assembled and tested, this package liquid cooler is ready for quick installation and immediate service. Capacities range from 5-100 hp., temperatures from −100 to 65F.

Unit includes complete refrigeration cycle, compressor, motor and starter, refrigerant controls, liquid cooler, condenser, piping, wiring, and insulation.—*Doyle & Roth Mfg. Co., 136-50 24th St., Brooklyn 32, N. Y.*

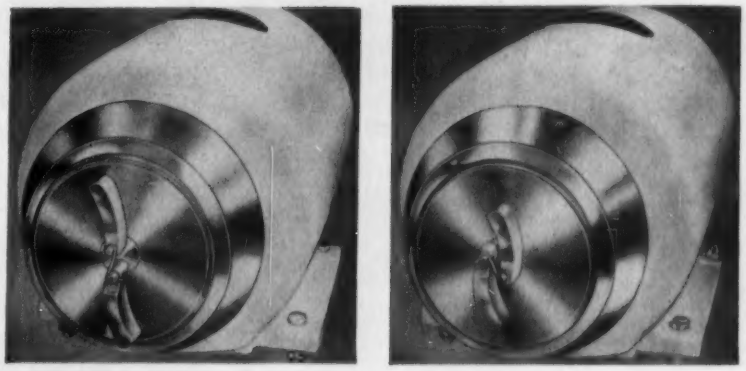
Circle 125A on Reader Service Card

New Coupler Design Ups Trailer Performance

To prevent disengagement during transit over rough floors and ramps, this automatic coupler now employs a compression spring designed to hold the engaging hook firmly in place. Formerly a counterweight was used.

Another improvement cited is a new bail section that eliminates "back-up" problems and permits positive coupling even at an angle.—*Nutting Truck & Caster Co., 1201 W. Division St., Faribault, Minn.*

Circle 125B on Reader Service Card



Pump's Impeller Vanes Adjust for Constant Volume

Designed to 3A sanitary standards, this pump delivers constant volume regardless of varying head or product viscosity.

Employed are compensating impeller vanes that automatically adjust as flow conditions change. They fan out at high head (left photo) to deliver maximum volume at that head. Then as head decreases, they reduce the diameter of their sweep (right). This action not only protects the motor from excess load, but permits use of a smaller motor since no reserve power is needed at low head.

Pump sizes: ¼-1 hp., 1¼-in. inlet and outlet; 1½-5 hp., 2-in. inlet and outlet; 7½ hp., 2½-in. inlet, 2-in. outlet.—*Girton Mfg. Co., Millville, Pa.*

Circle 125C on Reader Service Card

New Instrument Gages Plant's Noise Levels

Industrial noise, which can lead to deafness, may be measured and analyzed by this 20-lb. portable unit. In addition, it can be used to check compliance with noise ordnances.

Called "Soundscope", it replaces four individual instruments formerly required for noise analysis to permit—

- Elimination of noise at the source by redesign of equipment.
- Isolation of noise by insulation.
- Protection of exposed personnel.

Measurement range is from 24-150 decibels, or about that between a quiet home and the sound of an air-raid siren. Instrument measures overall noise levels and gages sounds in eight frequency bands. It also determines noise peaks within each band—important because the ear is more sensitive to certain frequencies than others.

Device can be calibrated in electrical or acoustical units. Power is supplied by seven dry-cell batteries.—*Mine Safety Appliance Co., Pittsburgh.*

Circle 125D on Reader Service Card

Porcelain-Faced Plywood Makes Superior Panel

Appearance and utility are combined in a new procelain-faced plywood panel for interior and exterior applications.

Known as Porc-Lin-Ply, it consists of a 0.012-in. steel "face" treated with two coats of fused porcelain for a hard, semi-matte finish. The core is of ¼-in. exterior-grade plywood. A metal-backing gives balance to the panel which weighs only 1¾ lb. per sq. ft.

Units resist moisture, odors, common acids, oil, grease, smoke, and solvents. Further, they are easily cleaned by wiping with a damp cloth. Sections are 36x96x$\frac{7}{16}$ in., and come in nine colors.—*United States Plywood Corp., 55 W. 44th St., New York City, 36.*

Circle 125E on Reader Service Card

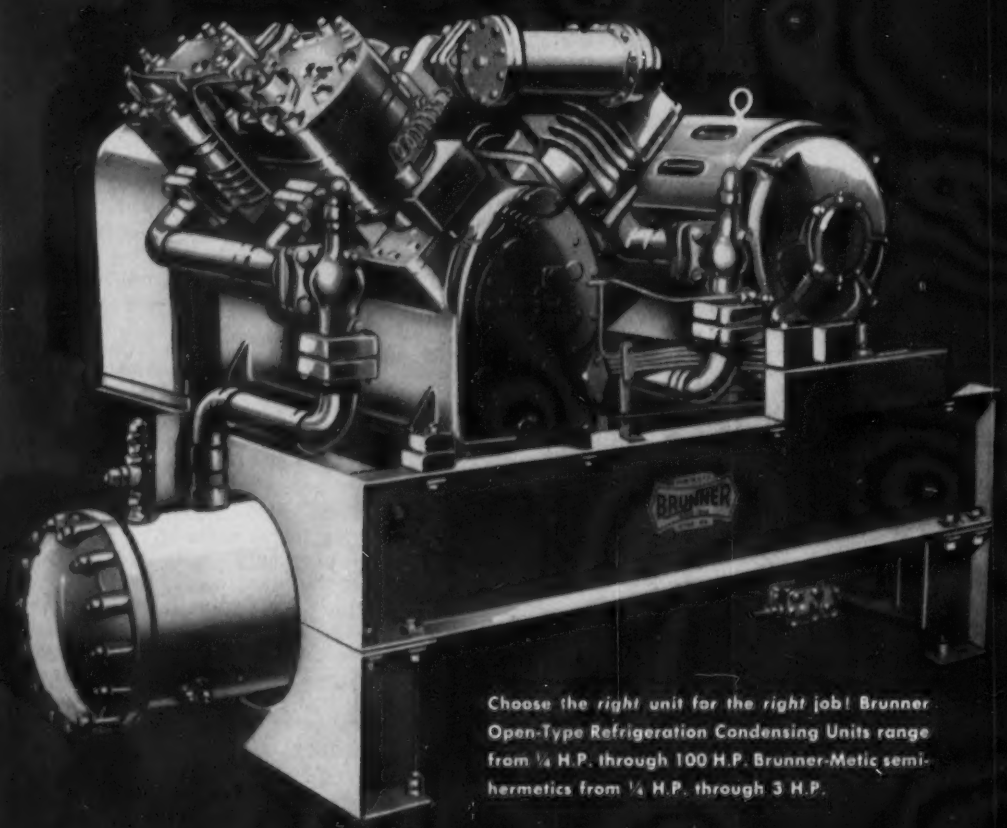
1906

Refrigeration had reached new heights of convenience and efficiency by 1906, thanks to engineering . . . and the iceman's muscles. The first Brunner-engineered product appeared in 1906.

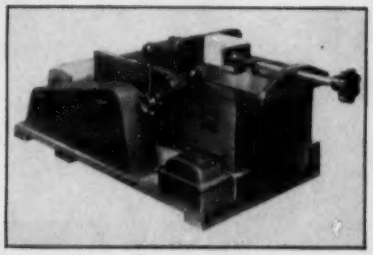
TODAY

Brunner Engineering serves the food processing industry with Refrigeration Condensing Units for every requirement.

PROVEN QUALITY
50th Anniversary
BRUNNER
DEPENDABLE



Choose the *right unit for the right job!* Brunner Open-Type Refrigeration Condensing Units range from ¼ H.P. through 100 H.P. Brunner-Metic semi-hermetics from ¼ H.P. through 3 H.P.



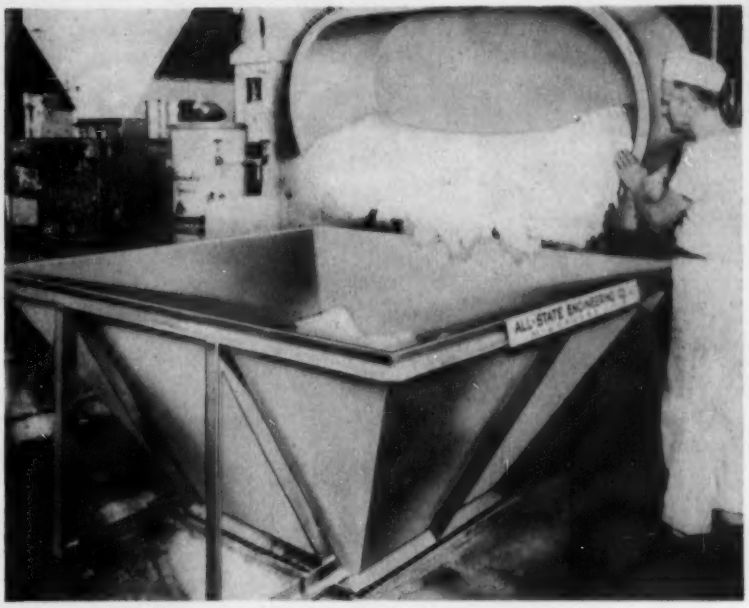
Compact Coder Notches 2,000 Labels/Min.

This versatile machine codes labels, cartons, and film and foil bags with small edge notches that are practically unnoticeable, yet easily read.

Known as Codedge, it handles labels of all sizes and shapes at 2,000 per min. with one unskilled operator. Codes can identify a variety of data—dates, batch numbers, production lines, and operators. Depth of cut is easily adjustable and changeover is rapid.

Compact unit fits on a 17¼x14½-in. base, weighs 100 lb., and has a ¼-hp. motor and starter.—*Griffin-Rutgers, Inc., 41 E. 42nd St., New York City, 17.*

Circle 127A on Reader Service Card



Stainless Hopper Permits Rapid, Easy Mix Transfer

Simplified materials handling, offering savings in time and labor, is a reported advantage of this trough-dump hopper.

In bakery operations, it permits one man to transfer dough from tank to sheeter in minutes. Furthermore, the hopper (All-State) is equally applicable to transfer of mixes and batters from work room to other equipment.

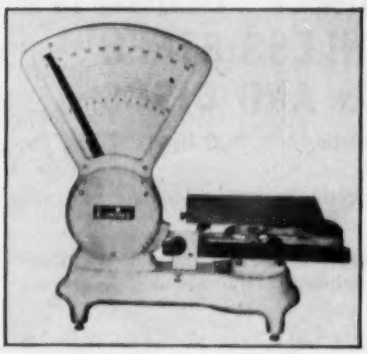
Unit consists of a stainless-steel hopper and a hydraulic or chain-driven fork lift. Smooth food-contact surfaces simplify transfer of material and cleaning of the hopper. Moreover, its portability permits flexible operation.

For handling dough, a trough is wheeled into position on the fork lift, then automatically lifted and dumped into the hopper. Gravity feed moves the dough through a set of rollers into the sheeter without additional handling.

Hoppers are made in three models for varying plant layouts. One is designed for two-floor handling where mixes are transferred to the sheeter below. Another uses minimum floor space on the same level where ceiling height is at a premium.

And where a floor-type unit cannot be used, a third model is built overhead. Dough is then transferred to conveyor belts at working height on the same level.—*All-State Engineering Co., 7050 N. 76th St., Milwaukee.*

Circle 127C on Reader Service Card



Speed, Accuracy Offered In Self-Balancing Scale

Two to four seconds is all it takes for a weighing with this automatic self-balancing scale. Its platform is stainless steel.

Weight is read directly to 1 gm. or 1/100 lb. without balancing of loose weights or beam poises. Further, an adjustable hydraulic damper brings the indicator to rest in 2½ oscillations.

The dial reads to 500 gm. (1.1 lb.) while total capacity of 5,000 gm. (11.1 lb.) is attained with a poise sliding on a notched beam. Sensitivity is ½ gm., accuracy is 1/100 of 1% of full scale.—*Arthur S. LaPine & Co., 6001 S. Knox Ave., Chicago.*

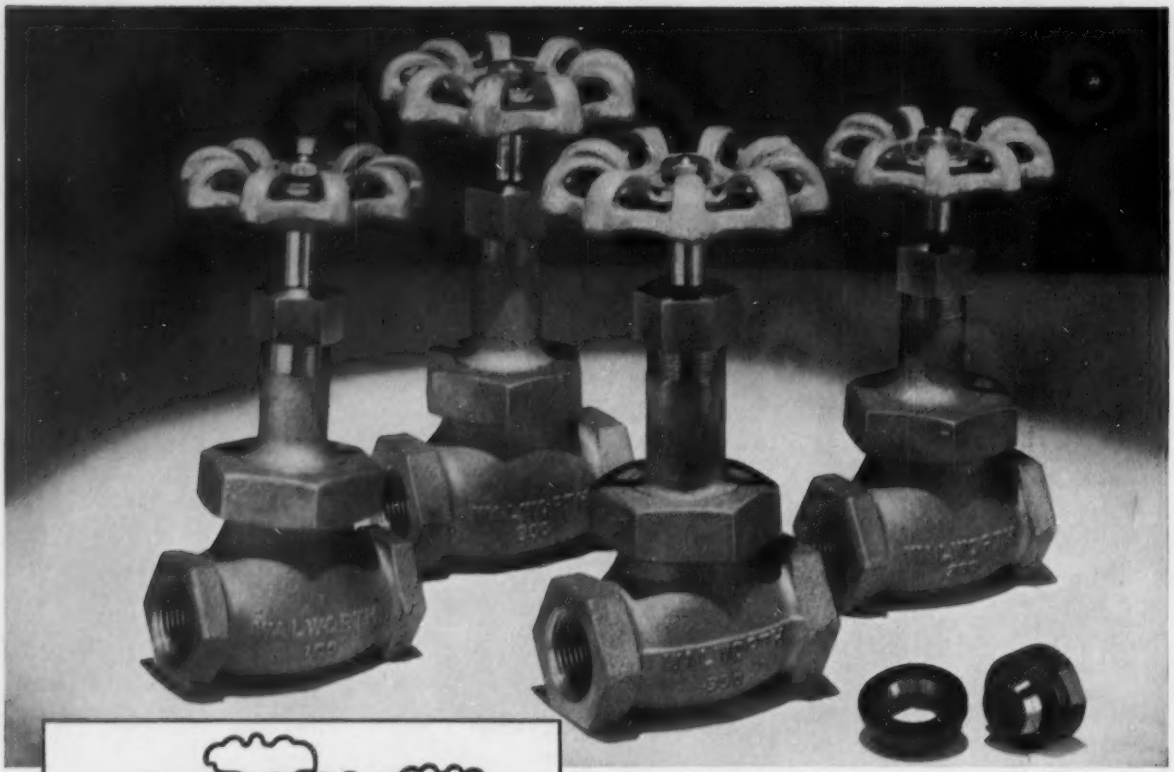
Circle 127B on Reader Service Card

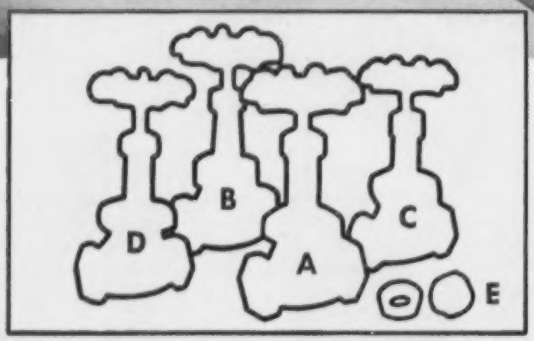
Checkweigher Monitors High-Speed Packaging

Just turning the dial indicator and register to the desired weight sets this automatic checkweight scale for handling cartons, bags, or drums on high-speed filling lines. Capacity ranges from 10-200 lb.

Versatile unit (Model 200SR) shows exact weight of package, counts number of cartons, and rejects under- or overfills. A printing recorder is optionally available. Scale employs a motor-driven conveyor suspended from a leverage system, and controls permit interlocking with other conveyors.

A weight-indicating dial may be mounted at remote packaging stations to simplify manual filler adjustments.





A — No. 225P.....350 WSP 550F, 1000 WOG
B — No. 260P.....300 WSP 550F, 600 WOG
C — No. 245P.....200 WSP 550F, 400 WOG
D — No. 237P.....150 WSP 500F, 300 WOG
E — "500 Brinell" Stainless Steel Plug Type Seat and Disc

Walworth offers four lines of Bronze Globe Valves with stainless steel, plug-type seats and discs. Advantages of these valves include:

• **Stainless Steel Plug-Type Seats and Discs,** heat-treated to a minimum of 500 Brinell hardness reduces wire-drawing to a minimum. Seats and Discs are machined and fitted simultaneously, assuring perfect mating.

• **Deep Stuffing Boxes with Glands** are fitted with reinforced, molded packing. Valves can be repacked under pressure when fully opened.

For Longer Bronze Valve Life . . .

"500 BRINELL" PLUG-TYPE STAINLESS STEEL SEATS AND DISCS

150 lb. 200 lb. 300 lb. 350 lb.

• **Oversize Stems,** made of high tensile strength silicon-bronze, assure long life.

• **Rugged Body Hexes,** are flat on top; do not interfere with wrench gripping body-to-bonnet union ring connection.

• **Bodies,** made of Composition M bronze (ASTM B61), have ample wall thickness to provide high safety factor.

• **Patented Handwheels** are air-cooled and designed with a "finger-fit grip." Makes turning easy even when wearing greasy gloves.

• **Identification Plates** secured by lock-washer under stem nut, show Figure Number of valves and make re-ordering sure and easy.

FOR COMPLETE INFORMATION, SEE YOUR WALWORTH DISTRIBUTOR OR WRITE FOR ILLUSTRATED CIRCULAR

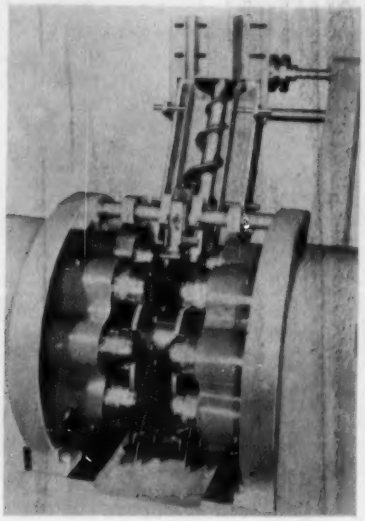
WALWORTH

60 East 42nd Street, New York 17, New York

SUBSIDIARIES: ALOYCO ALLOY STEEL PRODUCTS CO. CONOFLOW CORPORATION M&H M & H VALVE & FITTINGS CO.
SW SOUTHWEST FABRICATING & WELDING CO., INC. WALWORTH COMPANY OF CANADA, LTD.

Or an automatic compensator can be supplied to hold required tolerances. —*Thayer Scale & Engineering Co., Rockland, Mass.*

Circle 127D on Reader Service Card



Spiral Feeds Can Bodies To 500/Min. Flanger

Handling several sizes of gravity-fed can bodies, this high-speed spiral feeder accurately locates them in maker's 500-per-min. flanger. Thus, jams and rejects are eliminated whether cans arrive at intervals or in a steady stream.

Of the accelerated type, spiral is chrome plated and polished to prevent can damage. It is timed with the flanger, driven by chain and sprocket, and has a safety overload coupling.—*E. W. Bliss Co., 50 Church St., New York City 7.*

Circle 129A on Reader Service Card

Cools, Conveys Powders At 3,000 Lb./Hr.

Pneumatic systems for cooling and conveying of powders before packaging handle up to 3,000 lb. per hr. Cooling is to 100F. or below in the stainless or mild steel units.

Designed as a package for specific requirements, equipment includes piping, filter, cooler, suction fan, air valves, separators, and reheat coils if necessary. Clamp fittings are used. Installation and cleaning are easily handled by plant personnel.—*Henszey Co., Watertown, Wis.*

Circle 129B on Reader Service Card

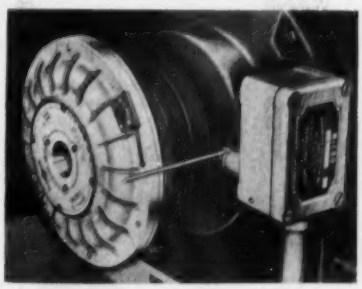
Extrudes Ground Meat Ready for Wrapping

Seen aiding the profitable marketing of ground meat is a new molding-head attachment that forms bricks of uniform weight, ready for packaging.

Known as Speed-E-Molder, it offers time- and labor-saving advantages. Unit is interchangeable with maker's steak-forming head and uses the same adapter collar, paper, and paper guide. This adapter permits the cast-aluminum head to be attached to all meat grinders.

A square ribbon is extruded onto a paper guide as grinder is fed with trimmed cuts. The paper has markings at 4-in. intervals, which permit convenient cutting into attractive 1-lb. blocks.—*Steak-E-Rator Co., 520 N. Western, Oklahoma City, Okla.*

Circle 129C on Reader Service Card



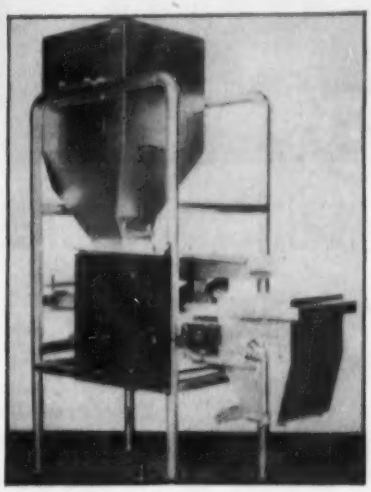
Thermal Cutout Protects Drive from Overheating

Unattended installations of maker's dry fluid drive (Flexidyne) may be protected against overheating by a new thermal cutout. Should an overload cause prolonged slipping and consequence heating, it cuts off the power and, if desired, gives an alarm.

Easily mounted alongside the drive, unit has a trigger spring held down by an alloy thermal pin. Before generated heat can cause damage, this pin melts and the trigger springs out to push a non-sparking striker of a special switch to the "off" position.

Cutout is easily reset by removing one screw, pushing back the trigger, inserting a new pin, and re-attaching with the screw.—*Dodge Mfg. Co., Mishawaka, Ind.*

Circle 129D on Reader Service Card



Net-Weigher Is Accurate, Versatile Dry-Fill Unit

Applications for this accurate weigh-feeding unit are said to range from simple filling of containers to complex automatic batching operations. Capacity varies from 5-100 lb. of dry materials charged into bags, boxes, cans, or jars.

Designated Heavi-Weigh, it consists of four basic elements: Supply hopper, electric vibratory feeder, beam-mounted weigh bucket, and electrically-operated gate.

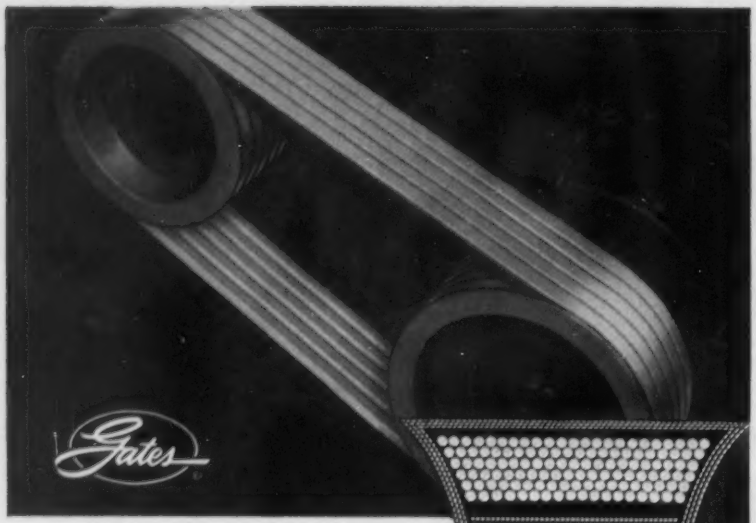
In operation, material flows from hopper to weigh bucket. When a predetermined amount has been delivered, the weigh beam moves to cut off the flow. Then, at a set time, the gate opens to discharge the weigh bucket.—*Glengarry Processes, Inc., Bay Shore, N. Y.*

Circle 129E on Reader Service Card

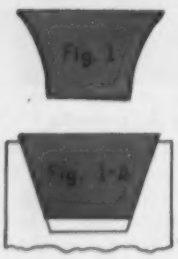
High-Clarity Wort Offered By Compact Hop Strainer

Employing a new method for instant separation of hops, this strainer is designed to produce high-clarity wort in minimum working space. Capacities are 10, 20 and 30 bbl. per min.

In operation, unit (Cascade) takes



Concave sides make V-belts last longer



The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

—World's Largest Maker of V-Belts

TPA 88

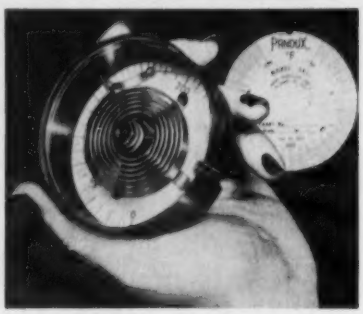
Gates Vulco Rope Drives

Equipment & Supplies

liquid from the brew kettle and cascades it off stainless-steel plates onto self-cleaning strainer plates. This action distributes liquid over the entire strainer surface, while special perforations in the plate keep the wort clear.

Sanitary design of the stainless unit permits quick, easy cleaning. Furthermore, it can be located on the floor, on top of a tank, or integral with a tank—*F. C. Deckebach Sons Co., 820 State Ave., Cincinnati 4, Ohio.*

Circle 129F on Reader Service Card



Logs Food's Temperature In Storage or Transit

Here's a compact thermometer that gives a permanent record of maximum and minimum temperatures of foods in storage or transit.

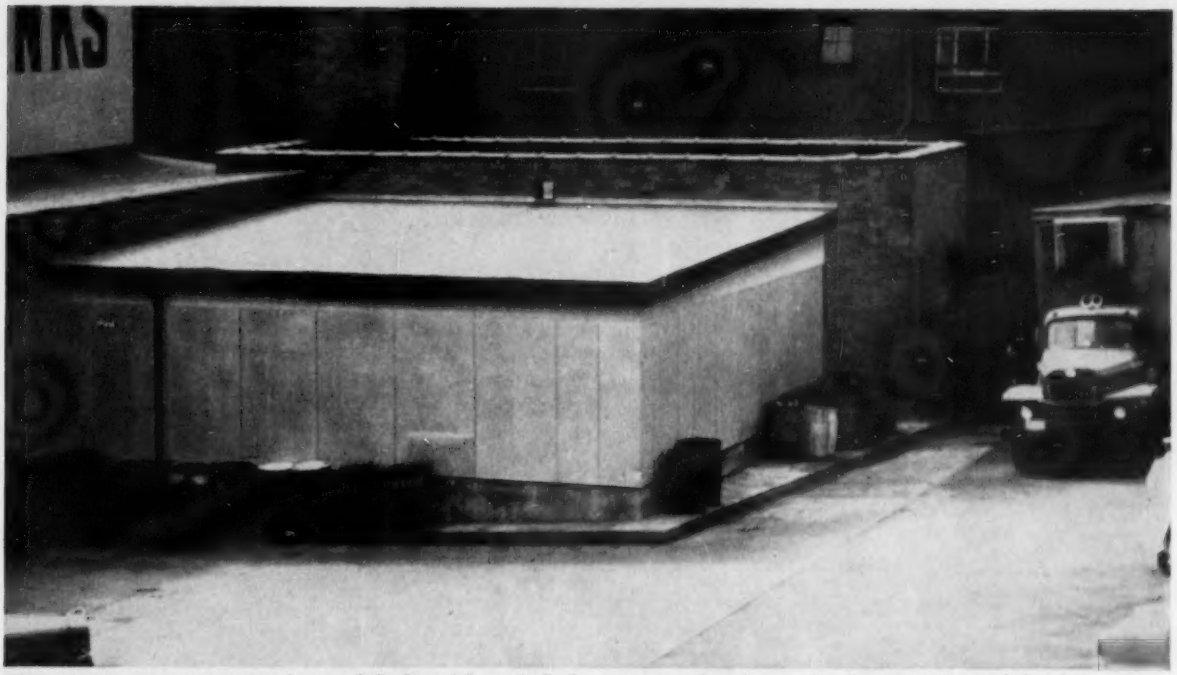
Available in two ranges—50 to 250 F. and −50 to 100 C.—unit (Pandux) employs a paper chart that is quickly replaced by unscrewing a thumb nut.—*Pacific Transducer Corp., 11836 W. Pico Blvd., Los Angeles 64*

Circle 130A on Reader Service Card

Special Ultra-Violet Lamps Aid Sanitation Inspection

For better observation of weak fluorescence—particularly in the critical pale blue, light green, and red areas—this ultra-violet lamp uses a special tubular filter to cut down on visible light emission from the "black light" tube.

Result is less light striking the object being examined, hence increased contrast due to more complete dropout



TWO ARMORPLY COLD ROOMS at Armour & Co. branch house in St. Louis are erected outdoors with only a protective roof. One keeps a constant 0°F., the other maintains 30-32°F. Metal faces of Armorply, by reflecting heat, help units hold temperature even on hottest days.

Now—sub-zero cold rooms you can erect outdoors—*quickly*

Armorply metal-clad storage rooms are low in cost . . . easy to expand

ARMORPLY WALLS AND CEILINGS stay clean with minimum care in locker of Armour's St. Louis branch. Room capacity can be easily increased by adding sections.

Cramped for cold storage space? An Armorply cold storage room can be installed anywhere—in back of your building, or even on your roof. And, with *panel construction*, you can expand or move it with ordinary labor.

Armorply storage rooms—as manufactured by Freezer Box Division, Annapolis Yacht Yard, Inc., Annapolis, Maryland—easily hold temperatures down to -10°F. The metal walls need no maintenance or painting; take wear and tear; can be hosed down to maintain cleanliness.

Most important, the installed cost of an Armorply cold box is no more than ordinary plaster-and-insulation units.

Armorply is waterproof plywood with a metal face permanently bonded on one or both sides. You can choose stainless steel, aluminum, lead, copper, or others. Armorply panels are light in weight, verminproof and impervious to moisture, remarkably strong and easy to fabricate. Armorply also finds wide use for supermarket Kroger-type doors, counterfronts and tops. Send the coupon for full information and a free sample of Armorply. Or see Armorply at any of our 87 offices in principal cities.

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FREE: Please send me free sample of Armorply and descriptive literature ☐.

Have your representative call on me with full details ☐. FE6-56

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COMPANY .....

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CITY ..... STATE .....

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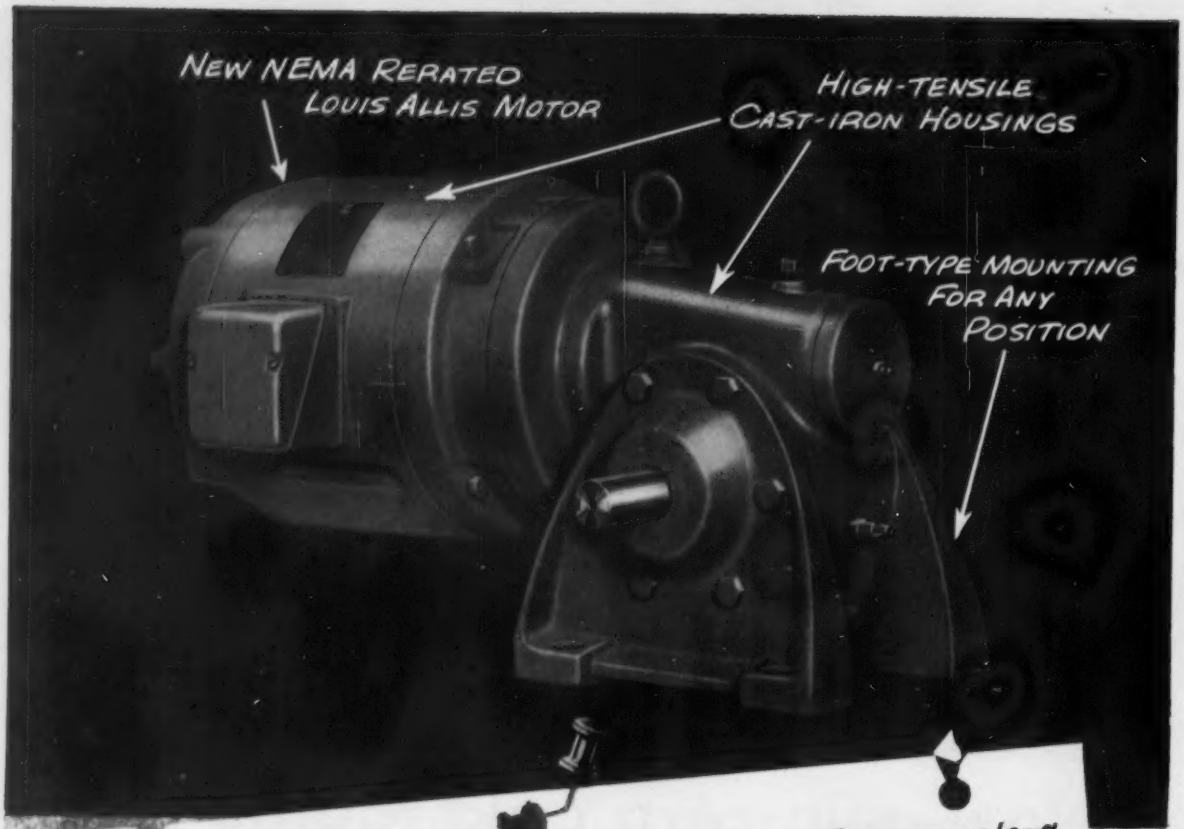

Louis Allis announces its L.A. line of right-angle gearmotors

Now available with new NEMA rerated L.A. motors for all applications — in sizes from 1/3 to 30 hp

Before we go into the many design features of this compact gearmotor, let's take a look at a few other advantages:

First of all, you can get either foot- or flange-mounted units. Secondly, you can have any motor enclosure you want. And finally, you can have any electrical or mechanical modification needed for any specific application.

In other words, here's a line of gearmotors ruggedly designed, versatile and efficient — to give you a sound answer to your right-angle gearmotor drive problems. Here's why:

- Both gear and motor housings are made of high-tensile cast iron to provide maximum strength, rigidity, and compactness.
- The worm, carefully machined from hardened alloy steel, is ground to close tolerances to give greater efficiency and longer life.
- The worm gear is cut from a high grade of wear-resistant alloy bronze.
- A double-row angular contact bearing and a ball bearing provide for radial and thrust loads on the worm shaft.
- The output shaft is mounted in tapered roller bearings for maximum load-carrying capacity.
- Ample oil-bath lubrication assures longer life and minimum maintenance.
- Special oil seals on all shafts keep the oil in -- dirt out and permit any mounting arrangement.

Here's a line of right-angle gearmotors that's very easy to apply. Standard speed range from 7-1/2 to 300 rpm -- special speeds also are available.

Flange-mounted right-angle gearmotor with new L.A. line explosion-proof motor

GM-103

THE LOUIS ALLIS CO.

MILWAUKEE 7, WISCONSIN

of the non-fluorescent background. Applications for the long-wave lamp (Black-Ray Model BLS-6) include general sanitation inspection, detection of rodent droppings, and in chromatography where extra filtration of visible light aids in identifying weak blue fluorescence.

Unit operates on 110-125v. a.c. (50-60 cycles), or may be used on batteries in a carrying case with special adapter circuit.—*Black Light Corp. of America, San Gabriel, Calif.*

Circle 130B on Reader Service Card

Dairy Valve Snaps Off For Daily Cleaning

Quick-removal design of this Y-type valve for milk storage tanks encourages thorough daily cleaning.

A simple V-band clamp permits easy takedown without tools. The leak-proof body, self-aligning to a companion flange, offers complete drainage and forms a flush joint. Either permanent or take-down gaskets may be employed.

Unit can be used as a throttle valve or converted to a fast-acting type by an adjustable plug assembly.—*Walker Stainless Equipment Co., New Lisbon, Wis.*

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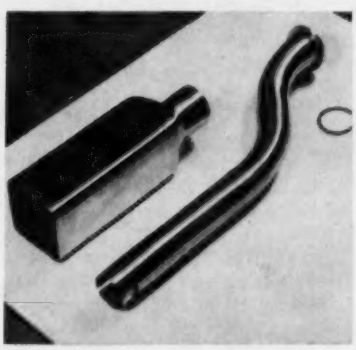
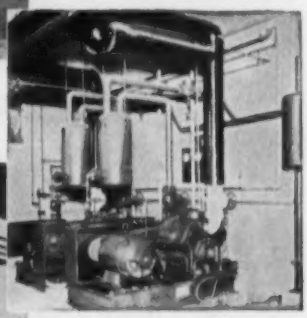


Long-Neck Stuffing Horn Cuts Production Steps

By eliminating multiple handling formerly required in stuffing fibrous casings—partial stuffing, removing

A typical food application is this new poultry processing plant of Farmers Exchange, Inc., of Durham, N. C. This plant processes 150,000 to 200,000 chickens a week.

Vilter Multi-Cylinder compressors which provide the refrigeration for Pakice Freezer and the Zer-O-Disc coils installed in the poultry storage room.



Poultry storage room at the Farmers Exchange. This 40' x 40' x 11' room is held at 30° F. by 512 lineal feet of Vilter Zer-O-Disc Fin Coils.

Q. How can you secure better and lower cost cooling for food products storage?

A. Install ZER-O-DISC Fin Coils and Vilter REFRIGERATION that costs less to own*

Vilter Zer-O-Disc fin coils are a smart buy for storage cooling. Correct temperature and humidity are maintained because these coils produce slow, even, positive air circulation naturally by convection. The extended fin surface cools the slowly moving air mass more quickly . . . floods the room with cold . . . holds temperature at proper level for better storage. There are no "dead spots" in the room. Product discoloration or shrinkage are minimized. With the complete absence of fans, blowers, or ducts, you will find that Zer-O-Disc fin coils give you less trouble than any other type of coil surface.

Vilter Multi-Cylinder compressors which provide the refrigeration are compact, statically and dynamically balanced, modern . . . designed for long, efficient, dependable life and economical operation.

Call in your nearest Vilter representative. Let him show you how to improve your storage cooling for poultry, meats, frozen concentrates, dairy and other food products and save with Vilter Zer-O-Disc fin coils.

Sold and installed by Vilter Distributor, Morris & Gorrell, Inc., Raleigh, N. C.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts . . .

ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

WELDED STAINLESS STEEL

TUBING and PIPE

Producing stainless steel tubes and pipe of the highest uniform quality takes the finest modern equipment. And, at Wallingford, whenever there is a better machine or a more advanced quality control device, it is obtained and integrated into our manufacturing operations.

But other less tangible factors . . . equally essential to highest product quality . . . can be supplied **only** by the expert judgment and skilled hands of experienced artisans. For this reason, personnel at Wallingford is a picked team of engineers, metallurgists and production specialists who work together to produce the finest.

FOR A BETTER PRODUCT, DELIVERED ON SCHEDULE, CALL ON WALLINGFORD.

Welded Ornamental, Mechanical, Pressure; Sanitary, Aircraft and Shaped Tubing and Pipe from ⅜" to 3" OD

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Write today for new booklet . . . "WALLINGFORD QUALITY TUBING AND PIPE"

STAINLESS · ALLOY · HIGH CARBON · LOW CARBON · STRIP AND TUBING

Equipment & Supplies

casing from horn, and tamping—this long-neck horn is said to boost production by 50%.

Two-piece unit consists of a 30-in. section and a 10-in. bell-shaped end. Latter is dimensioned to fit into 4x4-in. wire molds lying on a table next to the stuffer.

In operation, a casing tied at one end is pulled onto the neck of the horn, then a closed mold is slid over casing. Operator uses one hand to open stuffer valve, while holding loose end of casing at the goose-neck.

The mold moves during filling until it reaches the end of the bell-shaped horn. Then, operator closes valve, cuts meat block at end of horn, and passes mold to a worker who makes a second tie.

Designed by Luer Packing Co., Los Angeles, the stainless-steel unit is manufactured by *Visking Corp., 6733 W. 65th St., Chicago, 38.*

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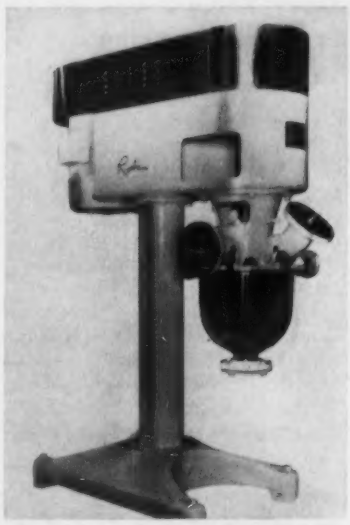


Versatile Size Reducers Handle Difficult Items

Fine pulping and homogenizing at low temperature and mixing of hard-to-handle pasty masses are specific applications for this versatile line of size reducers.

Known as Model RI, they permit free removal of secondary materials and easy change of speed and rotor diameters. Rotors are suspended from bearings for quick removal for cleaning.

Available in stainless or carbon steel, units range from ½-200 hp., rotor sizes 2-24 in.—*Rietz Mfg. Co., Santa Rosa, Calif.*

Circle 134A on Reader Service Card

NOW! LOW COST
MODULATING CONTROL
FOR TEMPERATURES UP TO 600° F

ANOTHER NEW IDEA FROM FULTON SYLPHON

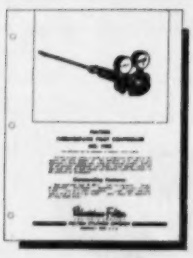
New FULTROL Thermostatic Pilot Controller No. 1100-C & D

Here is another example of how Fulton Sylphon gives you the best temperature control for your process at the lowest possible cost. This time it's an all-new FULTROL Thermostatic Pilot Controller—a simple, compact unit that now enables you to control temperatures up to 600° F. with *proportional* accuracy, but at *on-off* cost.

All that FULTROL needs is an air or other supply at a constant pressure anywhere between 18 and 40 psi. From then on, FULTROL strait-jackets temperature by modulating the output pressure to a final control valve, damper, or other device. FULTROL does all this by means of a simple, stainless steel thermal element. There are absolutely no troublesome pivots or levers.

What's more, you get all these extra features in the bargain:

- Instant knob adjustment of control setting over any 200° range specified between —50° F. and 600° F.
- Easily adjustable proportional band from 5° to 25° F.
- Protection against over-run temperatures (100° above range limit)
- Resistance to pressures up to 300 psi.



SEND TODAY FOR CATALOG SHEET NO. 10-28LG

Mr. Controls

Robertshaw-Fulton CONTROLS COMPANY

FULTON SYLPHON DIVISION • Knoxville 1, Tenn.

TEMPERATURE REGULATOR HEADQUARTERS, U. S. A.

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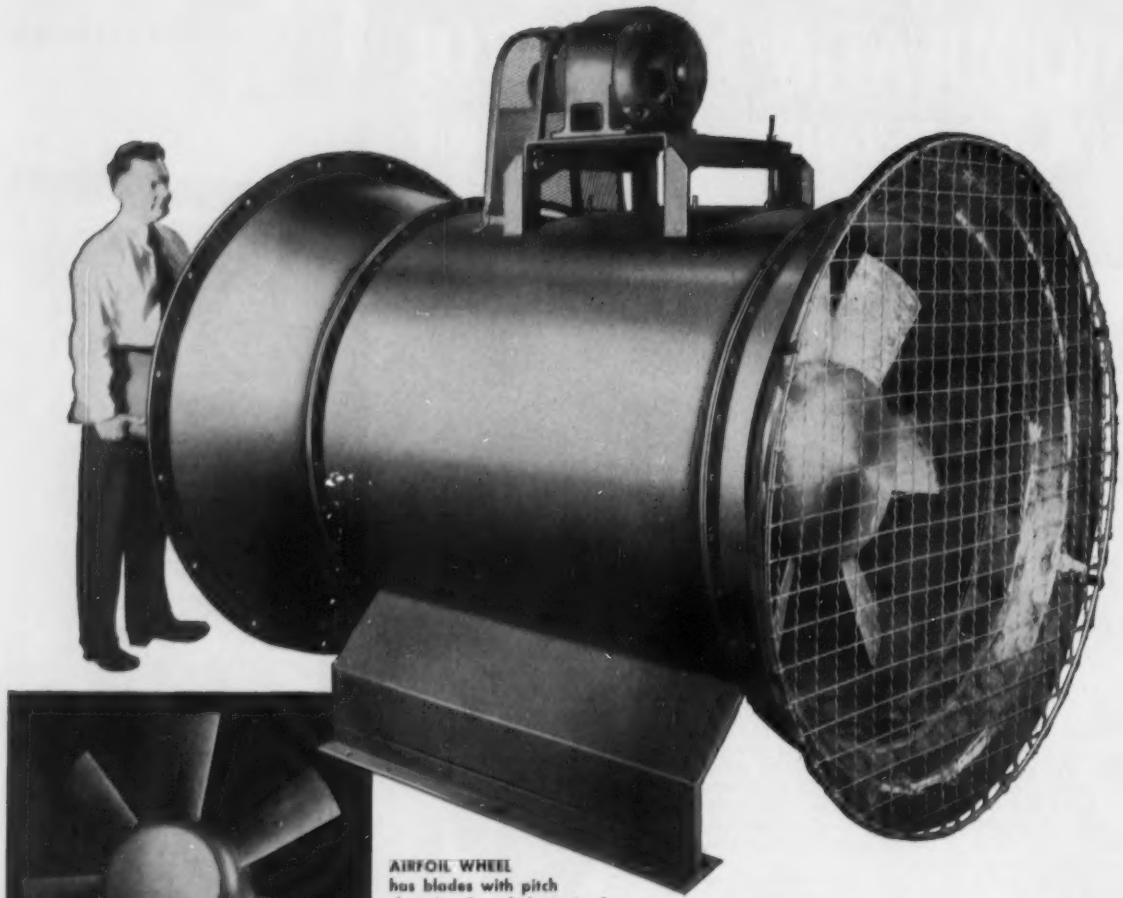
right for cooling!



AIRFOIL WHEEL
has blades with pitch changing from hub to tip, for uniform air flow — an efficiency "plus" feature in "Buffalo" Axial Flow Fans.

"BUFFALO" AXIAL FLOW FANS

Inherently a high-velocity fan, the "Buffalo" Axial Flow is ideal for handling air for cooling equipment. It is also unusually efficient in the normal pressure range between ¼" and 3". A compact package, it is easy to install in ducts or incorporate in original equipment. Also, uniform air flow across the welded steel or aluminum airfoil wheel permits slower operating speeds than ordinary propeller fans. Far more than a propeller fan in a housing, the "Buffalo" Axial Flow Fan is the result of extensive development and testing and has been proven in thousands of installations over many years. It is a typical "Q" Factor* product of "Buffalo" engineering, and will assure you satisfaction wherever you need air for cooling. Write for Bulletin 3533.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Scale Transmits Weight To Remote Recorders

New electronic methods of data handling now permit recording, tabulation, and remote digital indication of weight data.

Key to the system is the digital scanner (above scale) that signals remote devices. Thus, digital indication may appear on an illuminated scale. Weight records can also go to adding machines for printing on tape, or be transmitted to card-punch machines.—*Toledo Scale Co., Toledo, Ohio.*

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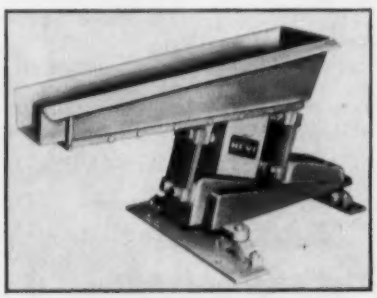


Vibratory Feeder Handles Variety of Bulk Solids

You can simplify delivery of solids for mixing, cooling, or packaging with this vibratory feeder. Unit handles a variety of bulk materials from big pieces to fine powders.

Known as HI-VI, it operates on 115/230v. a.c., without a rectifier, and

Here's how Hamilton Foods, Inc., of Chicago, automatically overwraps their frozen shrimp.

● A recent survey, made by one of the industry's largest national publications, revealed that Frozen Food Manufacturers use Hayssen Wrapping Machines by a margin of 2 to 1 over the nearest other make, and 4 to 1 over the next two. This overwhelming preference for Hayssen explains why it has become the standard of the industry. The Hayssen is completely automatic from the feed-in of the product to the ejection of the neatly, tightly overwrapped package ready for shipment. The Hayssen will wrap any size package in paper, film or foil, directly from roll stock with heat or glue seal. Let our packaging engineers help you with your packaging problems. WRITE US TODAY for further information.

HAYSSEN

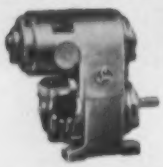
MANUFACTURING COMPANY

Dept. FE-6 • Sheboygan, Wisconsin

First in Automatic Packaging, Since 1910

Albany • Atlanta • Boston • Chicago • Dallas • Denver • Detroit • Los Angeles • Minneapolis
New York • Philadelphia • St. Louis • San Francisco • Seattle • Montreal • Toronto

STERLING SPEED-TROL VARIABLE SPEED MOTORS



STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

Let Sterling Electric Power Drive Engineers assist you in the selection of power transmission equipment and controls precisely co-ordinated with your machinery, product and production volume to help you achieve greater productivity. Sterling Drives correctly matched to specific job requirements can simplify cost reduction and improve your competitive position. Thousands of leading companies are profiting daily through installation of correctly engineered Sterling Electric Power Drive systems.

Write for Bulletin No. 185. Discover the big advantages Sterling Electric Power Drives can bring to your plant.

Sterling offers you a wide range of Electric Power Drives of advanced design—variable speed or constant speed—with manual or automatic controls.

STERLING ELECTRIC MOTORS

Los Angeles 22 • Chicago 35 • Cincinnati 37 • New York 51

Equipment & Supplies

uses an improved electro-permanent magnetic drive for high output. Three models have design capacities of 2, 4, and 10 tons per hr. Trays come in a range of shapes (16-gage steel or 304 stainless) with welded seams.

For flexible control of feed rate, maker also offers a remote unit employing a rheostat.—*Eriez Mfg. Co., Erie, Pa.*

Circle 137B on Reader Service Card

In-Stream Refractometer: For Continuous Q. C.

Here's a new instrument for continuous quality control—an in-stream refractometer that quickly detects changes in product composition.

The device measures the difference in refractive index between a flowing sample and a reference liquid. It has a sealed optical system, photocell, temperature compensation, and a null-balancing system. Readings may be taken directly from a dial or from a remote recorder. Accuracy exceeds ±½%.—*Barnes Engineering Co., 30 Commerce Rd., Stamford, Conn.*

Circle 138A on Reader Service Card

New Chemicals

New Detergent Solves Hard-Water Problem

Cleaning difficulties in hard-water areas may be overcome with use of a new detergent designed for water having hardness up to 50 gr. per gal.

Known as Multi-Power, it combines powerful detergency and rapid soil penetration with balanced alkalinity buffered to maintain constant

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

How to Sample Rock Salt for Screen or Chemical Analysis

Sampling bulk rock salt accurately is often a difficult problem. For when salt is stored in piles, coarser particles collect at the foot of the pile—while finer particles remain inside and at the top. A few handfuls of salt taken at random from the outside and bottom of such a pile almost always mean an inaccurate sample for analysis. Also, during transportation and handling, salt particles of different sizes tend to become segregated.

However, by following a few simple steps, you can easily obtain salt particles of a truly representative size range. This sample will then give accurate results in any type of screen or chemical analysis. Here are the modern sampling techniques approved for most plants where salt is used:

Stockpile sampling of bulk salt. Samples from either indoor or outdoor stockpiles should be taken at three separate points: at the top of the pile, at the base, and at one intermediate point. The sample taken at the intermediate point must come from deep within the pile. To prevent segregation of salt particles during this sampling procedure, a board should be pushed into the salt pile just above the point from which the sample is taken.

Sampling bulk salt in railroad cars or trucks. In sampling a boxcar load of salt, three trenches should first be made in the salt across the width of the car. The bottom of each trench should be at least 1 ft. below the surface of the salt, and approximately 1 ft. wide. Equal portions of salt can then be taken from nine equally spaced points along the bottom of each trench. Two of the nine points should be directly against the sides of the boxcar. Sampling in these trenches is best accomplished by pushing a shovel or sampling tube directly into the salt, and not by scraping horizontally.

The same general procedure may be used effectively to sample truckloads of rock salt.

Sampling between transport and storage. Rather than sample bulk salt in cars or in storage, many companies feel that more accurate samples can be taken during unloading—at some point in the handling process where a flowing stream of salt is accessible on all sides. The points at which salt leaves a head pulley or drops from a chute lip are two of the most desirable places for this type of sampling.

This "running sample" gives consistently excellent results, but it must meet the following conditions as closely as possible:

1. To obtain salt particles of all sizes, the sampling scoop must move at uniform rate across the entire *width* of the stream. Samples will generally be inaccurate if the scoop moves through the stream from front to rear.

2. The sampling interval should be uniform. And it is better to take small samples frequently than a few large samples.

3. The sampling scoop should have a relatively long rectangular opening, permitting a knife-like cut across the stream. The use of pails or shovels to sample the stream may produce an inaccurate sample.

4. Sampling should take place on a regular stream flow. When taken from an intermittent flow, samples may not be representative. Also, sampling should be carried on throughout the entire unloading period.

Moisture content. Samples should not be taken from bulk rock salt which has recently been exposed to rainfall or excessive humidity. Under these conditions, the proportion of insolubles will increase due to the leaching out of a certain amount of salt. Resulting analysis will then show a higher degree of impurities and a lower sodium chloride content than is normally present.

Finally, it must be remembered that no matter where the salt is sampled—the larger the sample taken, the more representative it will be for final analysis. In fact, many industries require a gross sample of at least 100 lb. from one carload of salt. This sample is then reduced to about 5 lb. for laboratory work.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all grades for industry. And we also make automatic dissolvers in metal or plastic for both types of salt. So we have no reason to recommend one type of salt over another; we simply recommend the type and size of salt most perfectly suited to your needs.

If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on salt sampling and analysis—just contact your nearest International sales office.

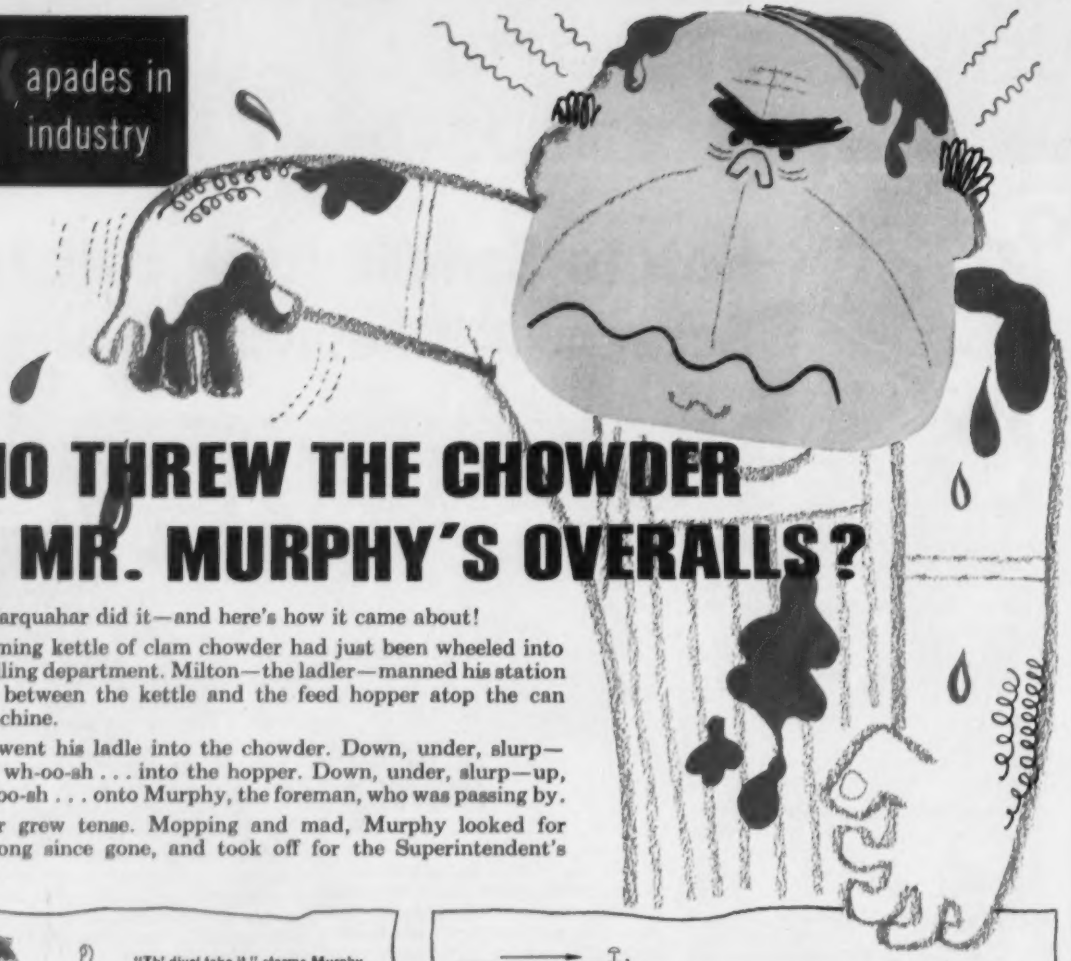
International Salt Co., Scranton, Pa.—
Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N.J.; Buffalo, N.Y.; New York, N.Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

Sampling Tube Is the Simplest Method

Most sizes of rock salt can be sampled from stockpile, bins, trucks, or railroad cars by means of a simple sampling tube approximately 1¼" in diameter and about 6 ft. long. Five to eight insertions of this tube into the salt will furnish a sample of about 10 lb. Some of the best tubes for sampling rock salt are those sold for testing grain. They have about 12 openings and a special auger point.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

S/K apades in industry



WHO THREW THE CHOWDER ON MR. MURPHY'S OVERALLS?

Milton Farquahar did it—and here's how it came about!

A steaming kettle of clam chowder had just been wheeled into the can filling department. Milton—the ladler—manned his station mid-way between the kettle and the feed hopper atop the can filling machine.

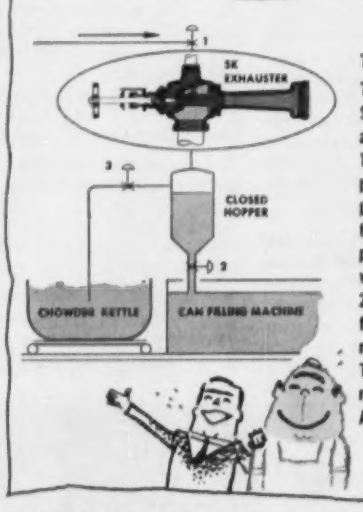
Down went his ladle into the chowder. Down, under, slurp—up, over, wh-oo-sh . . . into the hopper. Down, under, slurp—up, over, wh-oo-sh . . . onto Murphy, the foreman, who was passing by.

The air grew tense. Mopping and mad, Murphy looked for Milton, long since gone, and took off for the Superintendent's office . . .

"Th' divel take it," storms Murphy. "Twas meself just got dowsed again wit' hot chowder. Either we ditch that ould system, or . . ."

"Now, now, Murph," soothed the Super, "simmer down. I think I've found the answer to your problem in this Schutte and Koerting Bulletin."

Here they are—Super and engineers—up to their eyebrows in Bulletin J-1. Pinpointed data indicated a particular piece of jet apparatus for the scheme they had in mind. Then they phoned for a specialist—the SK Sales Engineer who is always close by. He added his recommendations.



THEY LICKED THE PROBLEM

The "star" of the new system is an SK Exhauster which is mounted on a closed feed hopper. When valves 1 and 3 are opened, the Exhauster pulls air out of the feed hopper, replacing it with chowder drawn from the soup kettle through a flexible pipe. When the feed hopper is full, valves 1 and 3 are closed and valve 2 is opened. The chowder then flows by gravity into the can filling machine. No ladling necessary now. This clean, closed system can be manually or automatically operated. And, Murphy's happy again.

MORAL: *Send for a copy of J-1 for your files. Make use of a qualified specialist—your nearest SK Sales Engineer.*

Schutte and Koerting COMPANY
MANUFACTURING ENGINEERS
2233 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

JET APPARATUS: Ask for Condensed Bulletin J-1.
ROTAMETERS & FLOW INDICATORS: Ask for Condensed Bulletin TB-RA.
VALVES: Ask for Condensed Bulletin V-1.
HEAT TRANSFER APPARATUS: Ask for Condensed Bulletin HT-1.
GEAR PUMPS: Ask for Bulletin 17-A.

Equipment & Supplies

cleaning power. Recommended for all types of plant equipment, product drains freely leaving no scum, spots, or film. Also aids in controlling corrosion of steel and iron.

It is compounded without inert fillers or carriers, thus offers high sequestering action to keep minerals in suspension. Available in 100-lb. drums and 325-lb. barrels.—*Klenzade Products, Inc., Beloit, Wis.*

Circle 138B on Reader Service Card

High Strength Reported For PVC Pipe Cement

This solvent cement, for joining PVC (polyvinyl chloride) pipe fittings and flanges, reportedly provides a joint as strong or stronger than the pipe itself.

The material is termed simple and economical to use. An ordinary paint brush usually serves as the applicator. A cemented joint can be handled in an hour and reaches working strength in 48 hr. Product is available in pints, quarts, and gallons.—*Tube Turns Plastic, Inc., 2929 Magazine St., Louisville 11, Ky.*

Circle 141A on Reader Service Card

Briefs . . .

Overstitched Side Seam for burlap bags curbs raveling of loose weft yarns that interfere with operation of automatic feeders.—*Bemis Bro. Bag Co., 408 Pine St., St. Louis 2.* (141B)

Wire-Braid Hose handling high-pressure hot water and steam has Neoprene oil-resistant cover, inner tube of heat-resisting compound. Sizes: ½, ¾, and 1 in. i.d. for steam pressures to 150 psi.—*Hamilton Rubber Mfg. Co., Trenton, N. J.* (141C)

New Fork Lifts provide power steering, automatic transmission, and an advanced hydraulic system. Capacities: 6,000-11,000 lb. in gasoline, diesel, and LP gas units.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.* (141D)

Composition Cutting Board for meat boning and fish cleaning is non-absorbent, odorless, and easily cleaned. Dimensions: 18x36x1 in.—*Park Rubber Co., Lake Zurich, Ill.* (141E)

Hand Refractometer with automatic temperature compensation and built-in illumination rapidly gages solids in 0-30% range, accuracy to 0.1%.—*American Optical Co., Instrument Div., Buffalo 15, N. Y.* (141F)

Oakite

HURRICLEAN

Gun

new steam-detergent gun packs a cleaning wallop

—yet it weighs in at only 6¼ lbs.

Shop-talk is growing about the "Hurriclean" Gun. Here is a steam-detergent gun any child could handle, it's that light, that safe—but see what it does! Hitch it to your steam supply, aim it at your toughest cleaning job. Watch it slam into heavy soils, grease, grime. It's almost like "wishing" the dirt away.

Steam-gunning with a hot detergent solution isn't new. What's new is a steam gun that is not heavy, not dangerously hot, not cumber. some. All these disadvantages are completely eliminated in the new Oakite "Hurriclean" Gun.

Light . . . Here is a gun that weighs six and a quarter pounds . . . and does heavyweight cleaning.

Safe . . . Here is a gun that's cool to the touch, hour after hour. The inner tube carries steam, the outer tube carries the cool detergent solution. There are no dangerous hot spots.

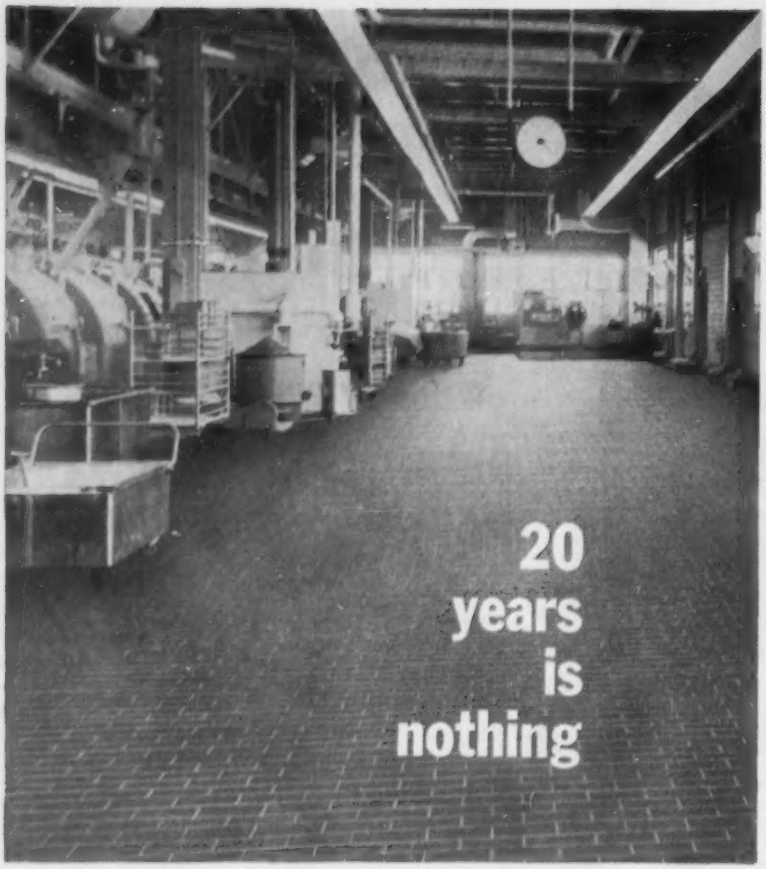
Easy . . . Here is a gun that rotates its spray a full 360° by a twist of the rubber grip. You don't swing the gun around, you don't kink hose, you don't even change stance. Cleaning "from under" is a cinch.

Find out how the "Hurriclean" gun can save you money by speeding up sanitation of your processing and handling equipment . . . and also cut costs on maintenance cleaning of floors, walls, equipment . . . and on special jobs like paint-stripping. Call your local Oakite representative, or write for booklet F9737 to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE

Export Division Cable Address: Oakite



for **SANI-BRICK** *flooring installed by* **DREHMANN**

It's a Fact. Many floors installed by Drehmann even 30 years ago are still sound in spite of punishing wear. More than 9,000,000 square feet of Sani-Brick in more than 10,000 installations prove no other type of corrosive resistant or acid-proof flooring lasts as long or costs as little to maintain. There is just no substitute for Sani-Brick installed by Drehmann.

Let a floor-wise Drehmann engineer give you the facts.

DREHMANN HAS THE FLOOR FOR MODERN INDUSTRY

DREHMANN

— SANI-BRICK FLOORS —

DESIGN
ENGINEERING
INSTALLATION
MAINTENANCE

DREHMANN PAVING & FLOORING CO.
Originator of Brick Floors • Est. 1869
Gaul & Tioga Streets, Philadelphia 34, Pa. • 507 Fifth Ave., New York 17, N. Y.

Briefs . . .

Circular Slide Rule shows hourly dry-ice requirement for maintaining loading temperature of a precooled cargo. —*Liquid Carbonic Corp.*, 3100 S. Kedzie, Chicago 23. (142A)

Jet Grinders employing compressed air or steam reduce solids to particles in the micron range. Feeds with up to 30% moisture may be dried, ground, and classified in one operation. Seven units offer capacities from ½-3,000 lb. per hr.—*Sturtevant Mills Co.*, 106 Clayton St., Boston 22. (142B)

Carton Bottom-Flap Gluer employs "closed system" to eliminate exposed glue pots and rolls, minimize cleanup and downtime.—*General Corrugated Machinery Co., Palisades Park, N. J.* (142C)

Truck-Refrigeration Drive is 3-hp. constant-speed unit that offers full cooling capacity at all engine speeds, saves weight and space by eliminating auxiliary gas engine.—*Sundstrand Hydraulic Division, Rockford, Ill.* (142D)

Expandable Bench System with interchangeable members permits flexible layouts. Combinations include in-line, back-to-back, and right-angle arrangements.—*Products For Industry, Stamford, Conn.* (142E)

Chemical Kit monitors concentration of hydrogen cyanide during fumigation, also determines residual levels.—*Compact Air Samplers, Box 656, Demarest, N. J.* (142F)

Batching Scale has rotary feeder that charges a gateless, tipping bucket. Controls are electrical and pneumatic, capacities range from 100 lb. to 100 ton per hr., average accuracy is ¼ of 1%.—*Thayer Scale & Engineering Corp., Rockland, Mass.* (142G)

Vibration-Proof Flow Alarm uses snap-action electrical contacts and magnetic float rod to signal high or low limits. Unit is self-checking—a signal results if alarm circuit fails.—*Fischer & Porter Co., 553 Jacksonville Rd., Hatboro, Pa.* (142H)

Homogenizer Redesign offers replaceable valve caps, new variable drive, and other improvements for wider capacity range, lower operating and maintenance costs.—*Cherry-Burrel Corp., 427 W. Randolph St., Chicago 6.* (142I)

Improved Mouse Trap offers increased catch with enlarged platform consisting of piece of cardboard fitted into the trigger mechanism.—*The Huge Co., 884-86 Hodiamont Ave., St. Louis 12.* (142J)

Three food plant lube problems STANOIL Industrial Oil can help you whip

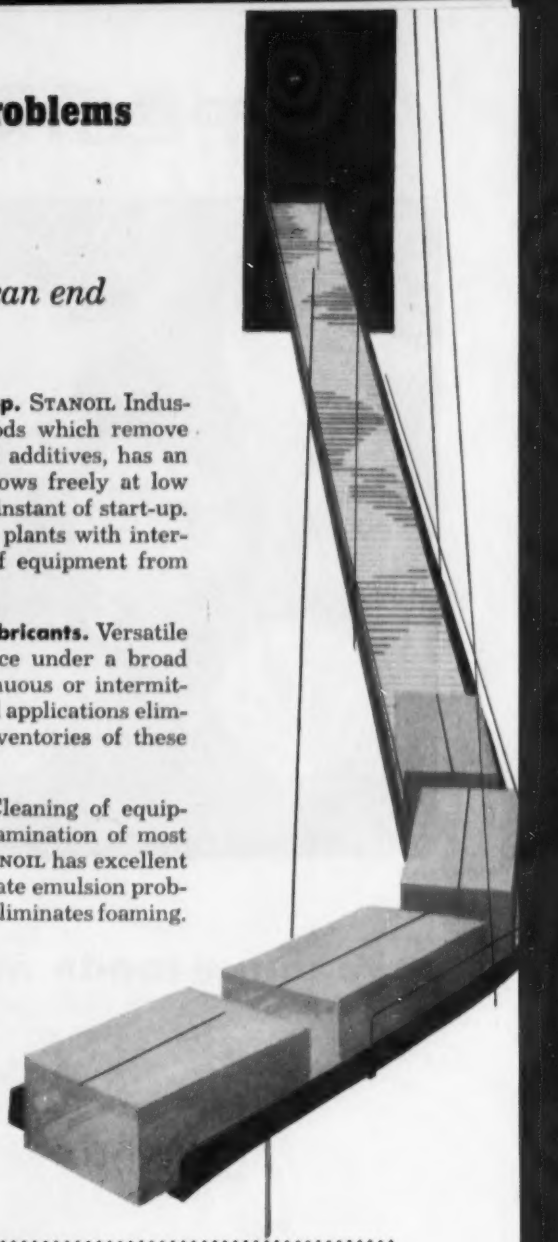
big maintenance headaches can end with switch to STANOIL

1. Poor flow of lubricant on cold start-up. STANOIL Industrial Oil, due to selective refining methods which remove waxy constituents and the use of special additives, has an exceptionally low pour point. STANOIL flows freely at low temperatures, is ready to lubricate at the instant of start-up. Candy, bakery and other food processing plants with intermittent production get full lubrication of equipment from start to stop.

2. Large inventory of special purpose lubricants. Versatile STANOIL gives top lubrication performance under a broad range of conditions...heat or cold, continuous or intermittent, high pressures and low. One oil for all applications eliminates special purpose oils, eliminates inventories of these oils, eliminates application mistakes.

3. Water contamination of lubricant. Cleaning of equipment and condensation mean water contamination of most oils with resulting water-oil emulsion. STANOIL has excellent demulsibility, is specially refined to eliminate emulsion problems, contains an additive which virtually eliminates foaming.

Check with your Standard Oil industrial lubrication specialist about converting your plant to STANOIL. There is one of these Standard men near you in any of the 15 Midwest and Rocky Mountain states. Call him or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.



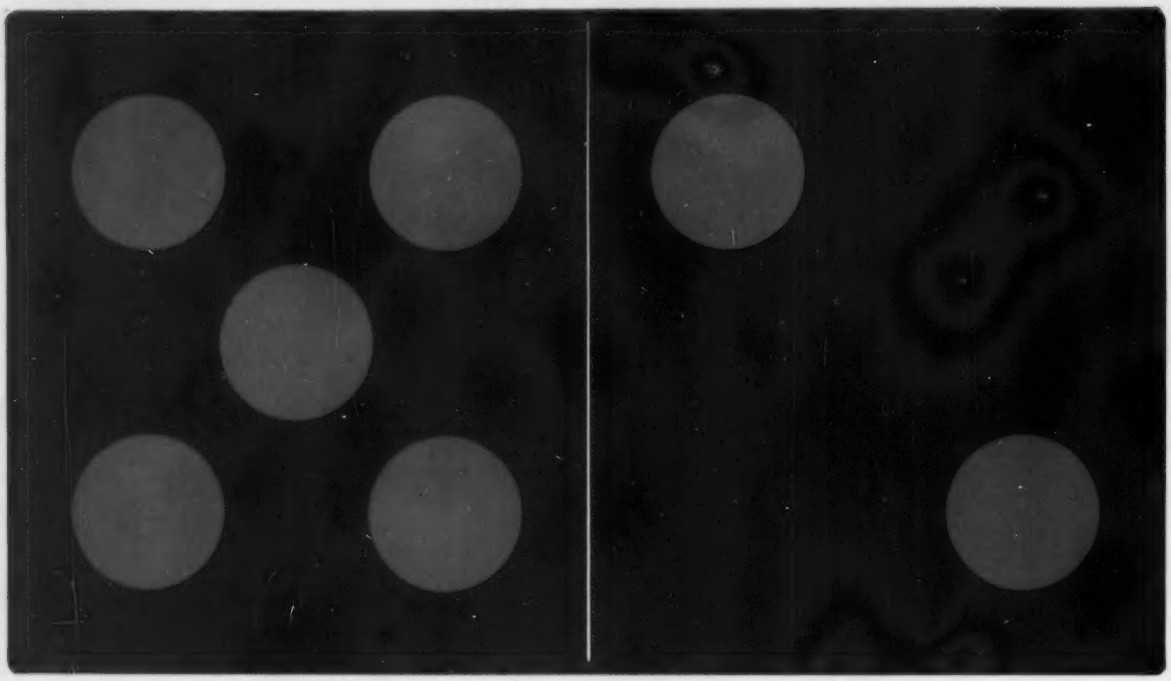
Quick Facts About STANOIL Industrial Oil

- **Stability.** STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention.** Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts.** STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change.** STANOIL has high viscosity index, is resistant to change in both high and low temperature service.
- **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY
(Indiana)

STANDARD

SPECIAL STARCHES



for canned foods with 7 NEW FEATURES

These are unique effects. Seven of them. For any canned food that requires thickening. All possible—and practical—when you use National's Special Starches:

- Natural color
- Full flavor
- Smooth creamy flow
- Uniform viscosity from cooking to serving
- Shelf life stability
- Dispersibility with added liquids
- Breakdown resistance under retort conditions

We'd like to demonstrate these seven new features. By selecting a Special Starch for each of your canned foods—ranging from soup to dessert. Just write. Or call your nearest National office.

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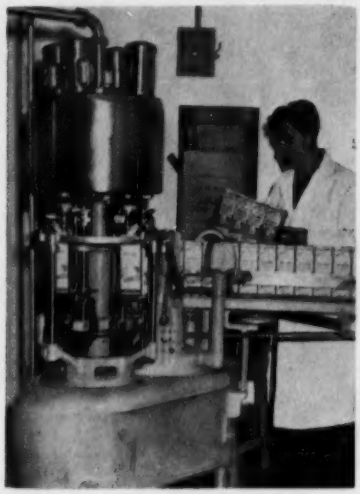
STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

Equipment Applications



Fills, Seals Juice Cartons At 25 Quarts/Min.

A one-operator machine is automatically filling and sealing quart cartons of single-strength orange juice at 25 per min. at Florida Fresh-Up Orange Juice, Inc., Glendale, N. Y.

The filler (Milwaukee, Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6) uses accumulative infeed and discharge conveyors, and electric-eye shut-off. A detector finger, which automatically rejects unopened or mispositioned cartons, prevents operation of filling valve unless opened cartons are in correct position.

Circle 145A on Reader Service Card

Special Motor Controls Operation of Palletizer

A special-duty gear motor has been developed for the high-speed palletizer designed and manufactured by Food Machinery & Chemical Corp., Riverside, Calif.

Palletizer's operating cycle calls for motor (Slo-Speed, Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22) to run forward and plug to a stop, applying the brake at the same time. A zero-speed switch is mounted directly on the motor-shaft extension through the brake. As motor speed approaches zero, this switch disconnects the motor winding from plugging reverse, but leaves the magnetic brake connected and applied.

Motor repeats this cycle as cases are stacked "in tie" on the pallet, and then has a reverse-running period plugging to a stop while pallet is unloaded or indexed to another position.

Circle 145B on Reader Service Card

HORSEPOWER

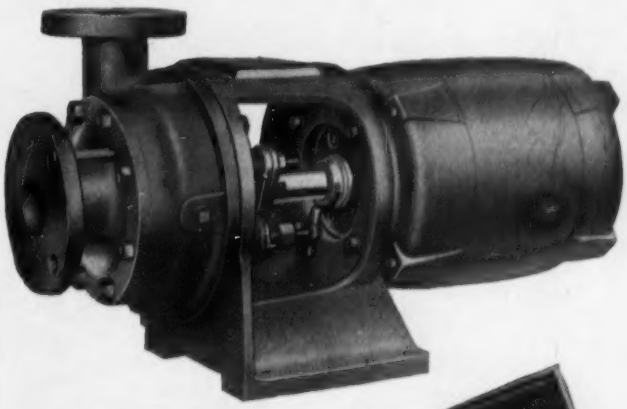
MEANS MORE TO THE PLANTS INSTALLING INGERSOLL-RAND

MOTORPUMPS

It's a fact that the efficient I-R construction often enables you to use a smaller Motorpump to do the work usually demanded of pumps of greater horsepower!

So, I-R Motorpumps reduce your costs in several ways. First of all, in original cost. Save weight and space, too. Deliver more gallons-per-minute per horsepower used . . . and cut maintenance costs as well, because Motorpumps are built for longer, trouble-free service!

If you're not familiar with the famous I-R Motorpump line you'll do well to get full details right away.



The latest catalog gives complete data needed to choose a Motorpump . . . from ¼ to 75 hp, capacities 5 to 2800 gpm, heads to 650 ft. Write to:

Ingersoll-Rand

9-366 11 Broadway, New York 4, N. Y.

Equipment Applications

Air-Conditioned Vehicles Up Driver Performance

Automotive air conditioning is credited with boosting efficiency and morale of delivery and sales personnel of Morton Foods, Dallas, Tex.

With low-maintenance air conditioners (Frigikab, Frigikar Corp., Dallas, Tex.) installed in tractor cabs, road drivers now cover more territory in less time despite high Southwestern temperatures. Furthermore, their safety record has improved and summer personnel turn-over is practically nil.

Similar units (Frigikar) in automobiles enable salesmen to drive 200-300 miles per day, arriving fresh and ready for work.

Circle 146A on Reader Service Card

Produce-Packaging Unit Saves Material, Labor

By forming, filling, and sealing its 8-oz. radish packages at 62 per min., Wm. Gressinger & Sons, Hartville, Ohio, reports a saving of 14¢ per 48-count carton in bag costs and filling labor. In addition, there has been a saving of 3,000 lb. of overweight per carload in product and freight.

Employed is an automatic unit (Compak, Hayssen Mfg. Co., Sheboygan, Wis.) that draws topped and washed radishes from its hopper—to a weight tolerance of one radish. Machine forms the unsupported polyethylene package from roll stock and cuts the sealed bag free for shipment.

Other products that may be similarly packaged include beans, macaroni, popcorn, and rice.

Circle 146B on Reader Service Card

Coolers Rapidly Defrosted By Hot-Gas System

Hot-gas-defrost unit coolers provide rapid and complete defrosting with minimum temperature rise in sea-food freezing and holding rooms at Phillips Sea Food Kitchens, Exeter, Pa.

Employing inner-fin coil construction, units (HG-240, Bush Mfg. Co., W. Hartford 10, Conn.) offer a separate defrost circuit and permits defrosting from the inside.

Two such units hold the 30x20x12 ft. freezer room at temperatures between 0 and −8F., while two others maintain the 30x60x12 ft. holding room at 30F.

Circle 146C on Reader Service Card

you get bigger pay loads when **COLDMOBILE** cools your trucks

Compactly built, a Coldmobile cooling unit takes up little inside-body space...lets you load more cargo for bigger pay loads and extra profits.

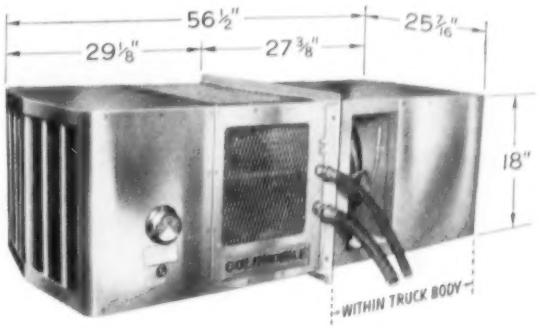
Meats, dairy products, sea food, flowers—in fact, any perishables—get positive cooling protection all the time because Coldmobile maintains proper temperature automatically and defrosts automatically.

Truck powered units eliminate special servicing. Here's real trouble-free operation with nothing to service—no ice bunkers to fill...no batteries or separate engine to maintain. Coldmobile units are truck powered, making refrigeration a by-product of driving. Constant, efficient cooling is provided with little or no effect on truck performance or fuel consumption.

New cooling economy—available in three models. Model "L" (350 lb.) is ideal for over the road operation, operates only when truck engine is running. Model "LE" (550 lb.) adds a convenient plug-in for electric stand-by operation. The Split "LE" (600 lb.) is available for low body trucks.

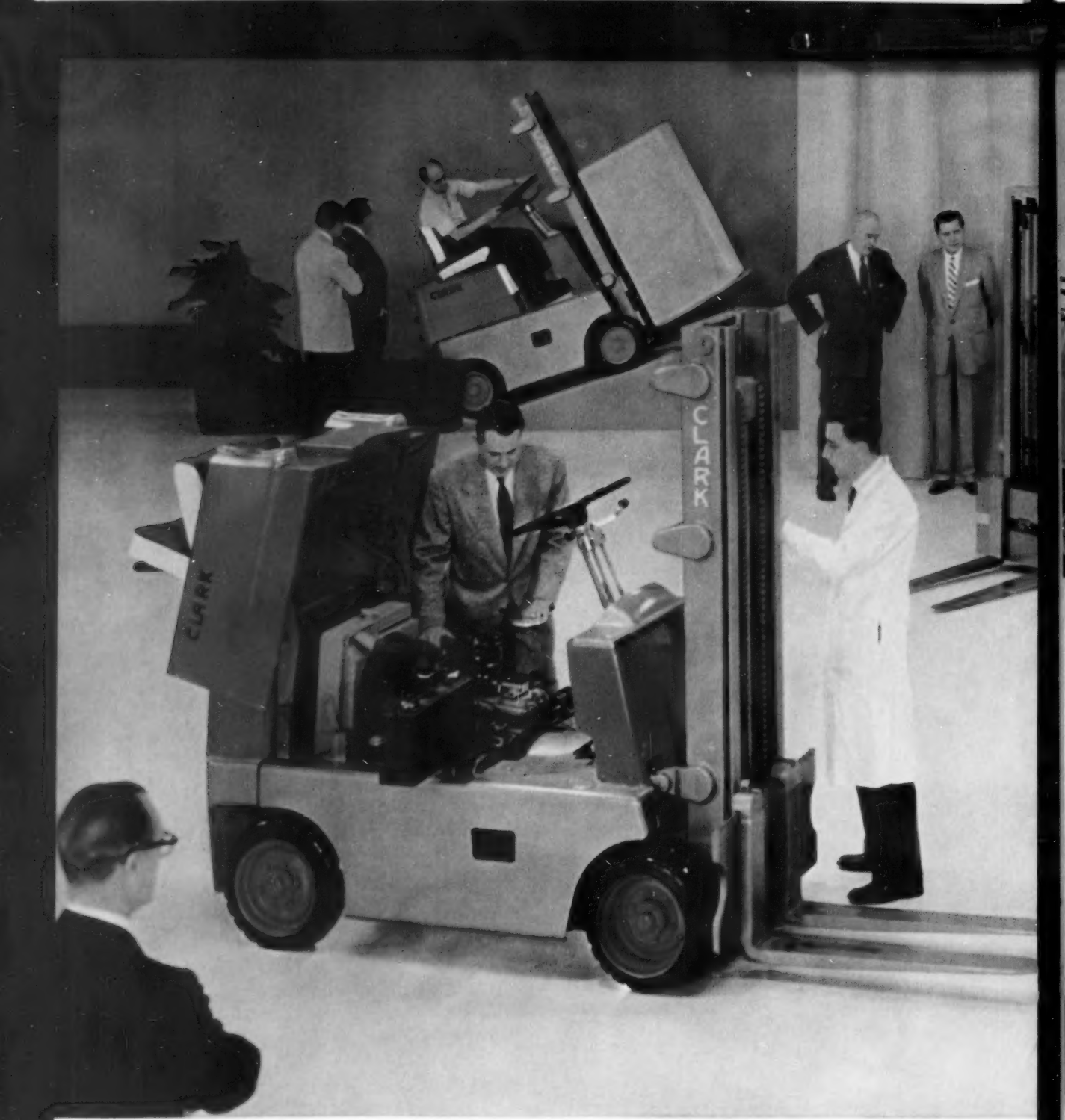
For complete information, write:

Coldmobile Model "L"—a complete, low-cost package that's easy to install, easy to maintain.



UNARCO

COLDMOBILE DIVISION
UNION ASBESTOS & RUBBER COMPANY
2900 West Vermont Street, Blue Island, Illinois



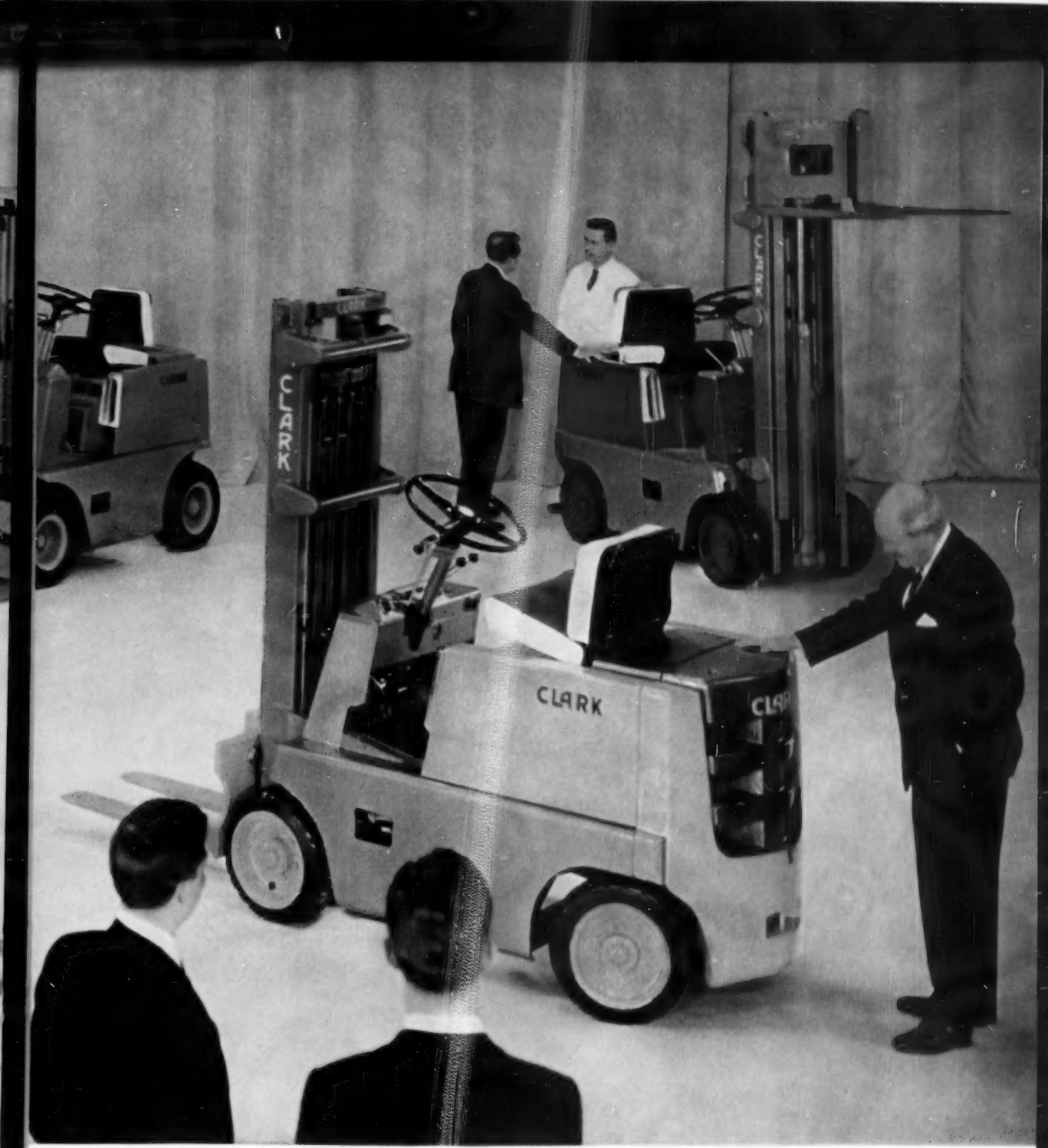
Get a REAL lift—see the all-new

Now, after three years and thousands of engineering and test hours, here is the best design, the most serviceability, the safest and finest performance ever built into one lift truck.

For easy servicing, the *entire* hood folds back. See the miracle of a longer wheel base, same over-all length, tighter turning radius.

Lifting speeds are higher; engine power, tractive effort and gradeability increased, yet control of movement is more precise than ever.

Safety? Comfort? Look at the dead man brake, simplified directional controls, extra-wide adjustable seat, less braking effort, and easy steering.



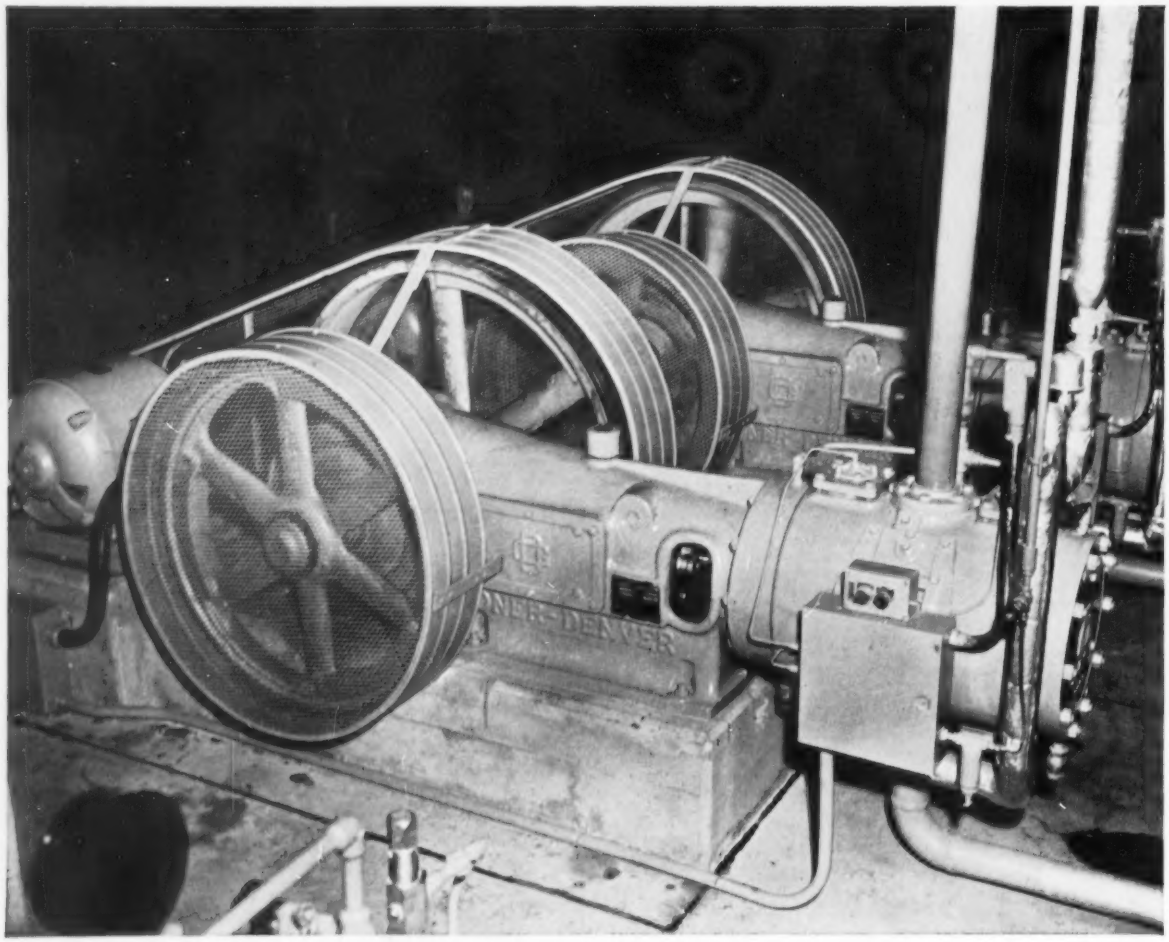
Clarklift "Leadership Line"

That's just the beginning. This is a completely new truck with dozens of new ideas . . . ideas you wanted in the *ideal* lift truck. Soon your dealer will be able to show them to you in models ranging from two to five thousand pounds capacity. See him . . . you'll get a real lift.

CLARK® EQUIPMENT

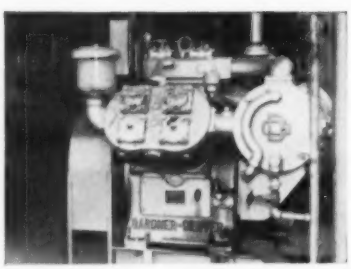
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek, Michigan

Gardner-Denver . . . Serving the World's Basic Industries



Built for the 168-hour week . . . Gardner-Denver RX Compressors

That's *continuous* service . . . and it goes on year after year in all sorts of plants where Gardner-Denver RX's occupy the compressor room. Bearings, valves and other moving parts are engineered to keep on the go . . . seldom require more than brief inspection halts. Bulletin HAC-40 gives details on RX models from 89 to 1292 cfm, for pressures from 15 to 150 psi. Write today.



Another popular industrial compressor . . . the compact, efficient Gardner-Denver WB. 142 to 1150 cfm.

GARDNER - DENVER

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GARDNER-DENVER Since 1859

KELLER TOOLS

Fireless Smokehouse

—Continued from page 65

the rotating generating disk is started, smoke is produced immediately and formation of smoke stops directly upon shutting off the motor.

A check has shown that a 21-cage, single-story smokehouse can be filled with smoke (100% density) in 3 min. and 21 sec. On the other hand, it used to take the sausage company 10 to 15 min. to get smoke from burning sawdust into a smokehouse.

2. The system is extremely easy to maintain. Unlike the sawdust-type generators, manual cleaning of the automatic log-type unit is unnecessary. Reason is that there is a built-in water-cleaning system.

Moreover, there's no bothersome accumulation of wood ashes, tars, resins, etc. In contrast, the conventional smoke generators are cleaned of sawdust ash every night. And further, the smokehouses are soap-washed and water-rinsed weekly for removal of tars and resins.

3. Actually, one can walk into a smokehouse served by the new unit with little smarting of the eyes.

4. Unit is compact, occupying roughly a 3x3x6-ft. space.

5. It takes only about 3 min. to load a log into the smoke generator. And a single 6x6x35-in. hickory log will generate smoke for 18 hr. This is with 65 lb. applied (five weights, 13 lb. each).

In comparison, the start-up of a conventional generator requires igniting dampened sawdust and shoveling sawdust into a feed hopper three or four times a day.

6. Better plant housekeeping is assured, since the squared-off logs (see illustrations) can be neatly stacked in less floor space. Generally, sawdust had to be stored in make-shift bins, usually which spilled around the area of the smoke generator.

7. Smoke is confined within the generator, inasmuch as there is no seepage.

8. Experience shows that constant dry smoke is generated into the smokehouses, according to Slotkowski's sausage maker, Otto Valentine. And no longer are there humidity variations traceable to differences in wet- or dry-burning sawdust.

9. There's no "heat" to the smoke, which is water spray-washed to the same temperature as the water. Such "cold" smoke is ideal for smoke-treating products like summer sausage, smoked liver, liver sausage, etc.

Sawdust-generated smoke, in these instances, produces unwanted heat. Operators must, therefore, maintain houses at desired low temperatures.

10. The new unit permits easy switching to different types of hardwood logs.

11. Amount of smoke generated can be easily varied according to the number of weights placed in the 3-shelf weight-holder above a log.

12. This generator can be hooked up with any smokehouse—single or multi-story, air-conditioned, etc.

13. With sawdust "out" and the new "cold" smoke used, there is much less chance of suffering a plant fire.

Now for a look at the operation of the fireless smoke generator in the Slotkowski sausage factory:

A solid hickory log (6x6x35 in.) is loaded into the unit and secured between the 3-shelf weight holder (on top) and the floating spring-holder (on bottom).

The weight-holder (9x10x14 in.) rides along four vertical guide rails (¾ in.) on eight ball-bearing wheels (1½-in. dia.). Positioned directly atop the log, it will carry 15 of the 13-lb. weights, or 5 weights per shelf. Weights are stored in an open stainless-steel cabinet adjacent.

According to amount of smoke needed, the density can be quickly changed from light, to medium, or to heavy smoke—or any intermediate degree—by varying the amount of weight applied.

A press of a pushbutton then starts a 5-hp. motor (having end-thrust bearings to withstand log pressure). The motor's bearings are pre-lubricated and permanently sealed.

Through a vertical shaft (1¼x6 in.), the motor then drives the 9½-in.-dia., 8-toothed, knife-bladed disk, rotating it at a 1,750-rpm. speed. Bladed disk's contact with the weighted log then generates the smoke. Reportedly, the disk need only be replaced after two years' use.

Simultaneous with start-up of the motor, a solenoid opens, causing introduction of water through a vertical ¾-in. pipe and then through a horizontal, perforated pipe surrounding the rotating smoke-generating plate.

This water picks up material abraded from the log, washing it into a screened (¼-in. mesh) stainless-steel catch pan (6x12x12-in.) and subsequently into the floor drain.

At the same time, another solenoid opens to start flow of water through a single-nozzle spray. Entire water flow—for spray head and disk cleaner—is 1½ gpm.

Generated smoke then travels through a 5-ply stainless-steel filter and goes via a 7-in. duct to feed the single-story smokehouse.

End (Resume reading on page 66)

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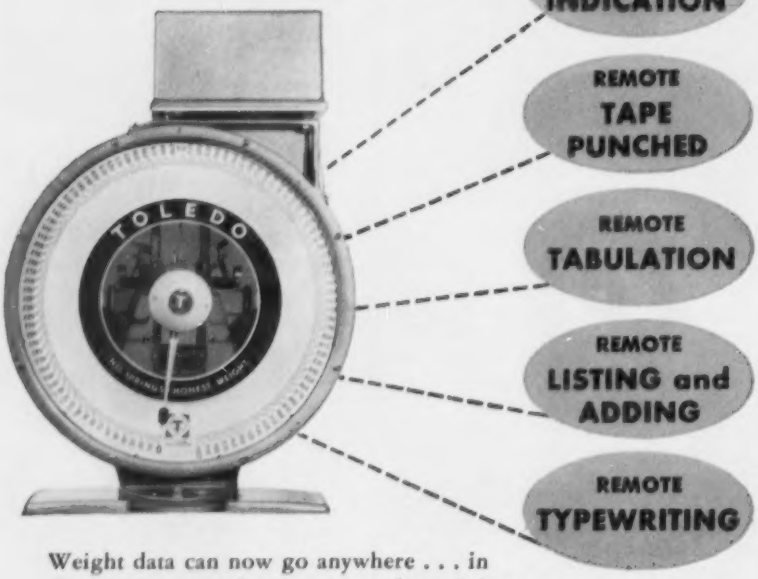

Weight data can now go anywhere . . . in the form most useful to you . . . through Toledo's remarkable new electronic system of remote data handling. Even though the weights originate in production, inspection, testing, shipping or receiving, the weight data travels instantly for remote digital recording in the form and location that best suits your needs. This greatly extends the capabilities of TOLEDOmation and assures for you maximum weight cost control and usability of weight data.

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This Toledo cabinet interlocks 22 scales in an automatic batching system.

Through TOLEDOmation all ingredients are fed into successive batches in proper sequence, including operation of gates and feeders. In addition, all dials are automatically scanned and the digital weight data is recorded on an electric typewriter for each batch.

SEND FOR BOOKLET ON NEW TOLEDO REMOTE DIGITAL WEIGHTS . . . Toledo Scale Company, Toledo 1, Ohio

TOLEDO® HEADQUARTERS FOR SCALES

Speedily Built Freezers

—*Continued from page 97*

then Foamglas insulation (6 in. on freezer floors; 5 in. on tank rooms), followed by the concrete wearing slab. Walls are two layers of the 3-in. insulation blocks.

Unique Ceiling Support

As for the ceilings, these are generally of pan construction and utilize 8 in. of insulation when they constitute the outside building roof and 6 in. when on the interior of the building. One of the freezer rooms at Brocton employs T-iron ceiling construction.

In most cases, the freezer and cooler rooms are put up in the interior of an existing building. However, the recently erected concentrate freezer room at Brocton was built out-of-doors as an addition to an existing structure.

Essentially, construction of the freezer walls consisted simply of erecting two layers of 3-in. blocks. Since the insulation is composed of hermetically sealed glass cells, no vapor barrier was needed in erecting the freezers.

One side of the structure is against an existing building and the other three are self-supporting walls of the insulation. A galvanized steel panel wall protects against pilferage and the elements.

Double Action

The freezer, used for grape concentrate, is divided down its center by another free-standing Foamglas wall. This arrangement allows one-half to be employed as a freezer at controlled low temperatures while concentrate is shipped from the other side. This situation is then reversed, with shipping from the just-frozen stock and then lowering of the temperature for freezing in the other side.

The specific choice of insulation was a most important factor in meeting the requirements of the new type of construction. Cellular glass was selected because it has a compressive strength of over 7 tons per square foot, thus allowing the building of self-supporting walls—one of the key requirements.

Previously, this cellular glass has given good service in the floors of refrigerated tank rooms. Here, the weight of our large stainless steel tanks of stored grape juice demanded an insulation with high compression strength.

End (*Resume reading on page 99*)

No other spray-dried flavors are more carefully guarded than Norda Nodes, to insure complete excellence, from starting spray to finished powder.

Nothing's known like Norda Nodes

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Producing just-ordinary spray-dried flavors never would have interested Norda. That is why Norda developed Norda Nodes, and why Norda Nodes come only from Norda.

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NEW PACKAGES & PRODUCTS

Triple Wine Box

Quality Fruit Wines Corp., Yonkers, N. Y., is using a multi-pack for its sweet wines. Three ½-pt. bottles of elderberry, blackberry, and cherry are packed in each window sleeve.

Front panel of the one-piece carton is die cut to form the three windows and two separators. Printed red and blue on white, the carton features an illustration of the appropriate berry over each window.

Carton was manufactured by Thames River Div., Robert Gair Co.

Circle 154A on Reader Service Card

Concentrated Tomato Juice

Newest canned product of Instant-Made Tomato Products Co., Stockton, Calif., is a concentrated tomato juice, prepared by mixing with cold water.

The product is packed in 6-oz. and 11-oz. cans. The smaller can makes 24 oz. of juice, the larger one 46 oz. In addition to tomato juice, the concentrate may be used in sauces, soups, or aspics.

Amber Milk Bottles

An oblong, ½-gal. milk bottle of amber glass is being manufactured by Owens-Illinois Glass Co. for major Southern creameries. Advantages are greater convenience in storage and handling.

Surveys indicated that the larger size was becoming more popular among consumers. Production men liked it because it could be handled economically and at high speed with the proper washer and filler equipment.

The amber glass was selected to protect vitamins and natural flavor of the milk.

Circle 154B on Reader Service Card

Longer Apple Storage With Polyethylene Bags

A new storage technique developed by Bakelite Co. is reported to extend the hitherto restricted storage life of Golden Delicious apples. The system calls for storage of the apples in plastic-lined crates in refrigerated warehouses.

The film liner provides a flexible, moisture-proof barrier. It is actually a large polyethylene bag which holds 40 lb. of fruit. Top is not sealed, but merely rolled over and tucked under the top slat of the crate.

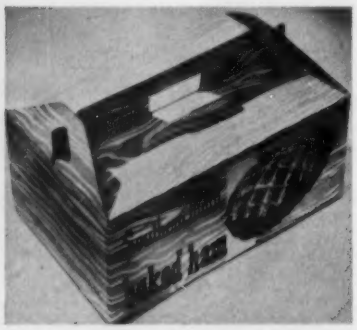
When the apples are first placed in the warehouse, temperature is dropped to 29 deg. F. for a few days to draw off field heat. Temperature is then kept at 31-33 deg. until marketing time. After 7-10 days, moisture beads form on the inside of the bag. This would ordinarily be lost to circulating air.

The new technique is reported to keep the apples firm and sweet for up to 6 or 7 mo.

Circle 154C on Reader Service Card

Parafined Pickle Pack

Both dill and sweet pickles coated with wax are being marketed by Green Bay Food Co., Green Bay, Wis. The pickles are packed in a paperboard box under the Peter Piper label. Boxes contain either nine dill or twelve sweet pickles. Wax coating is removed by cutting a groove, twisting, and peeling.



Carry-Home Ham Carton

A new carry-home carton manufactured by Atlanta Paper Co. is reported to have boosted sales for Southern Maid hams. Printed in one color on white-lined corrugated board, carton is sturdy, yet compact and easy to open.

Circle 154D on Reader Service Card

Low-Cal Dairy Dip

Recently marketed in northern New York is a low-calorie, sour cream dip. Called U'Leat, dip was developed by Miss Estelle T. Bosse, Lancaster, New York. The pasteurized culture has a minimum of butter fat and is mixed with horseradish, vinegar, and spices. Each tablespoon contains 26 calories.

TAILOR-MADE PACKAGING PAPERS

POWDERED FOODS: Pouchpak*, a laminate of special pouch paper, polyethylene and foil . . . heat-seal coated . . . protects Borden's Instant Starlac. Run on Pneumatic Scale Model 769 machine at 45 per minute. *TM

COFFEE: The flavor of Horton's Coffee is carefully protected by Riegelpak, a duplex package of special pouch stock and heat-seal glassine. Run at high speed on Package Machinery Transwrap.

CAKE MIXES: Dromedary Cake Mix contains two Pouchpak* pouches, made of poly-coated laminated glassine printed by Riegel. Hayssen Model F machine runs 48-60 packages per minute.

CRACKERS: Nabisco Sugar Honey Grahams are kept crisp in a Riegel "Tailor-Made" waxed glassine. The ½ lb. inner-seal units are run 60 to 85 per minute on Model 49 Battle Creek machine.

DESSERTS: Knox Gelatin is packaged in special Riegel pouch paper, gravure printed with registered heat-seal imprint. Bartelt machine fills, seals and cartons pouches at high speed.

CANDY: Strong, attractive Pouchpak* packages protect the quality of M & M's Peanut Candies, yet are easy to open and stack neatly. Run at 80 per minute on Stokeswrap Model "BS" machine.

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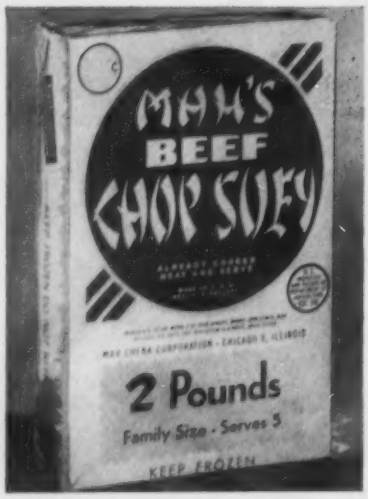

Chop Suey for 5

A heat-and-serve family-size portion of beef chop suey is marketed by Mah Chena Corp., Chicago. Serving five people, the product is packaged in a foil overwrap. Each box holds 2 lb. of chop suey.

Lasagne in Foil

Three Italian cheeses—mozzarella, ricotta, and parmesan—are used in Buitoni Foods Corp.'s new frozen lasagne. Packaged in a 9 oz. aluminum foil container, the product has a tomato, meat, and spice sauce.

Frozen Garlic Bread

Pizza Fro-Corp., Chicago, is packing frozen Italian-style garlic bread under the De Salvi's label. The bread, treated with butter, cheese, and spices, is packaged in an aluminum foil pan with a windowed cover. To prepare, the lid is removed, and the pan placed in the oven for 5-6 min. Bread is thick-crusted Italian style.

Small Portions Popular

A new economy-pack of twelve "buffet-size" can of vegetables in six varieties has been introduced by Gibbs & Co., Baltimore. Designed to meet a demand for smaller food portions, the products are reported to be rising in popularity among consumers in market areas.

The new size cans are also being used to develop the multi-pack trend. A compact, convenient package offers the consumer 2 8-oz cans of either beans, beets, peas, carrots, potatoes, or pork and beans.

Refrigerated Nut Rolls

Quick Caramel Nut Rolls is the newest member of the Pillsbury refrigerated product line. Each can contains eight fresh-dough rolls and a plastic bag of caramel and chopped nut topping.

The rolls are prepared by crumbling the topping into a pan with water and topping with the unbaked rolls. Approximately 25 min. in the oven is needed for preparation.

Canned Pop for Troops

Military installation in Korea will soon receive shipments of Pepsi-Cola on flat-top cans. The canned pop will be processed at a California plant. No distribution is planned outside of the one military outlet.

Hires Root Beer is also to be available in cans to armed forces personnel.

Chili Beans in Cans

Designed for the institutional trade, a 20-oz. can of Heinz dehydrated chili beans is packed with a spice bag of chili powder and seasoning. Formerly available only in bags, the beans are dehydrated in a special process. Can simplifies storage and reduces spoilage problems.

When ground meat, tomato paste, water, and the contents of the spice bag are added to the beans, each can yields three full qts. of chili con carne. Beans need not be soaked before use.

Improved Nestea Marketed

The Nestle Co. has introduced a new Nestea with improved solubility. Reported to dissolve instantly in cold water, the product offers two advantages. It is not necessary to step up the strength of the tea to balance rapid dilution when hot water melts ice cubes. Flavor is also improved.

"Flying Lobsters?"

Modern lobsters take to the air
alive in light-weight, leak-proof H & D
corrugated boxes, lined with Insulpak.®
What do you ship?
We can help you box it better.

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Who says *this* belting is *right* for handling your food products? We do . . . on the strength of operating tests conducted by our research department. Customers say so too, because of proven performance. Careful, continual checks of materials assure top workmanship and quality for extra-long life. Performance tests, with your products in mind, guarantee easy cleaning, no residual contamination, and no "belt-taste." That's why—with complete confidence—we recommend for *your* food handling:

VICTOR SUPRENE . . . special-woven cotton duck belting thoroughly impregnated with an exclusive Neoprene compound. Water-proof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475 . . . highest quality solid-woven cotton belting impregnated and coated with a special Neoprene compound. Developed for use where laboratory cleanliness is a must. Washable with hot water or steam. Resists rancidity and deterioration.

For food handling the modern sanitary way select from— A COMPLETE LINE including:

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- Balata Belting
- Solid-Woven Belting — untreated, impregnated, coated — many widths and plies
- Canvas Stitched Belting
- Belting Specialties

3279

Victor Balata & Textile Belting Co.

Icing in a Bag

Packed in transparent plastic bags, Ready-Made Frosting is newest product of Mallet & Co., Inc., Pittsburgh. When the icing is packed with brown and serve rolls or un-iced bakery products, consumer need only snip off a corner and squeeze to apply.

The 2½-oz. bag is heat-sealed to hold the white or maple icing.

Mallet has also recently introduced a texturated jelly, packed in a similar plastic bag. Homogeneous and without lumps, the jelly is smooth flowing and will not weep.

Non-Toxic Decals

Labeling hard skin fruit and vegetables has been made simpler with a new decal manufactured by Meyercord Co., Chicago. Non-toxic and designed for simple, high-speed application to either boxed or loose fruit, the decals are made in any desired size, design, copy, and color combination. They drape easily on rounded or irregular surfaces.

Circle 158A on Reader Service Card

Musical Hot Dog Pack

Frankfurter fanciers can now get music with their dinner thanks to a novel backboard developed by Tee-Pak, Inc. The backing is a plastic laminated cardboard phonograph record, available in four different tunes. Playing for 1 min. at 78 rpm, the record is available in any backboard size. It is waterproof and printed on the side away from the meat. Red, black, and yellow vegetable inks are used.

Circle 158B on Reader Service Card

New Liver Pate

Dressed in an unusual new package, liver paté is the latest product added to the Merkel, Inc., line. A transparent plastic dish holds 6-oz. of the all-meat product. Closure is a flexible white plastic cap, printed in red, blue, and silver.

The paté was developed after extensive taste-testing and is made from an exclusive Merkel process.

Pouches for Cocoa

Heat-sealed, laminated Glassine pouches are used for Royal Instant Cocoa's individual servings. Material protects the cocoa from moisture and guards flavor and aroma. The measured portions are particularly useful for hotel and restaurant operators.

Pouches were designed by Paul Straher, New York City.

Circle 158C on Reader Service Card

Dips for Chips

The first of four new instant dips has been introduced by T. J. Paisley Co., Medina, O. The cheese flavored dip is added to milk and then whipped to prepare. One package serves four to six people.

Called Dip for Chips, the product is made of dehydrated cheese, dry milk solids, edible vegetable gum, salt, onion, garlic, celery, citric acid and spices. It is packaged in a colorful paper-foil-polyethylene laminated pouch manufactured by Dobeckman Co.

Circle 159A on Reader Service Card

Canned Spanish Olives

An illusion of transparency is a big selling point in the 3½ oz. can developed by American Can Co. for Real-emon-Puritan Co., Chicago. Used for Spanish olives, the can protects the olive brine from clouding.

Circle 159B on Reader Service Card

New Products Shorts

Quart Cans have been adopted by San Francisco Brewing Co. for its Burgomeister pale beer.

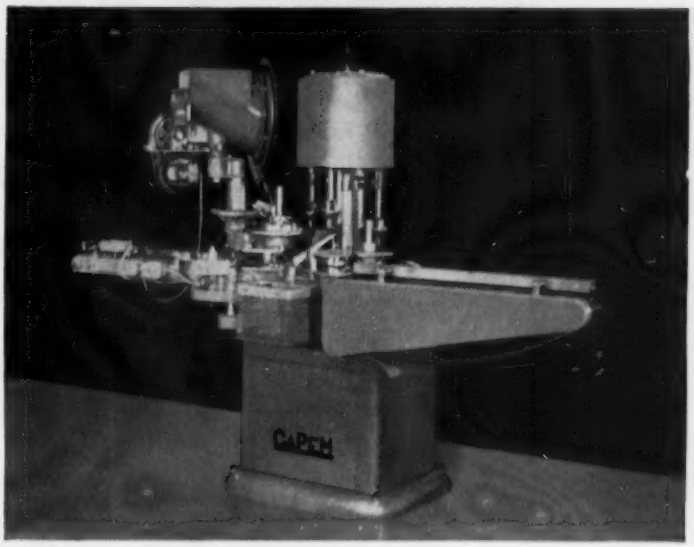
Junior Food Addition at Beech-Nut Packing Co. is a chicken noodle dinner, packed in a 7¼-oz. jar.

Cherry-Wood Smoked bacon is latest Armour and Company product.

Blended Grape Beverage called California Grape Nectar is processed by Muscat Co-operative Wineries, Kingsbury, Calif.

Frozen Spaghetti and Meatballs has been marketed by Morton Frozen Foods. A foil dish holds 8½ oz. of the product.

IF PACKAGING COSTS ARE
SKYROCKETING
CaPeM SCREW CAPPERS
WILL BRING THEM
DOWN



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CaPeM is fully automatic . . . delivers a uniformly dependable seal . . . handles bottles, cans, jars and jugs from 2 ozs. to gallons . . . applies all types of metal and plastic screw caps . . . is easily synchronized with all standard types of related equipment.

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Honeywell service begins when you first decide you need instruments, and continues long after your instruments are paid for. First, the Honeywell field engineer goes into a huddle with your own engineers and production men, and makes a complete rundown on what is to be measured or controlled, to what accuracy, under what conditions. Then he goes to work with Honeywell application engineers who have first-hand experience in your industry and processes.

The *complete* system is designed, including valves, interlocks, safety devices, with instrument recommendations drawn from the big Honeywell line. Honeywell makes all types of instruments . . . electronic, electrical, pneumatic and mechanical. And because the line is so complete, instrumentation recommended for your application is selected without bias. Instrumentation by Honeywell means the economy of "one-stop shopping" and a single responsibility for your complete control equipment. After your system is designed, produced and delivered, Honeywell engineers are available to supervise installation and start-up.

Expendable supplies for all your instruments . . . thermocouples, wires, wells, recorder charts, ink . . . can be purchased at maximum convenience and economy through the HSM (Honeywell Supplies Man) Plan.

Suppose you need spare parts in a hurry. Your nearest Honeywell branch office is your storeroom for standard items, and the Parts Depot in Philadelphia carries a complete spare parts inventory. Most deliveries are made within 24 hours. There are more than 110 Honeywell service centers spotted strategically throughout the U.S. and Canada. You'll find it's a mighty comforting feeling to have such service so close, whenever or wherever you need it.

Honeywell help in emergencies is swift. But many emergencies can be prevented with periodic service. Under a simple agreement, a Honeywell service man will visit your plant at regular intervals to inspect, clean, and adjust your instruments and controls.

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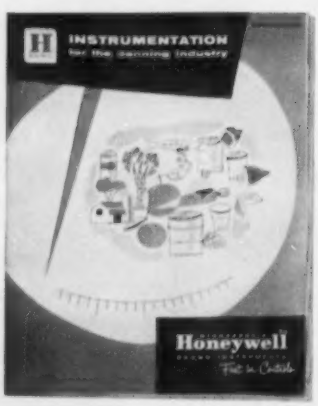
Honeywell offers far more than instruments. It offers unparalleled service that begins when you call a Honeywell sales engineer. He's as near as your phone.

Your retorts can "go automatic" . . . . . with



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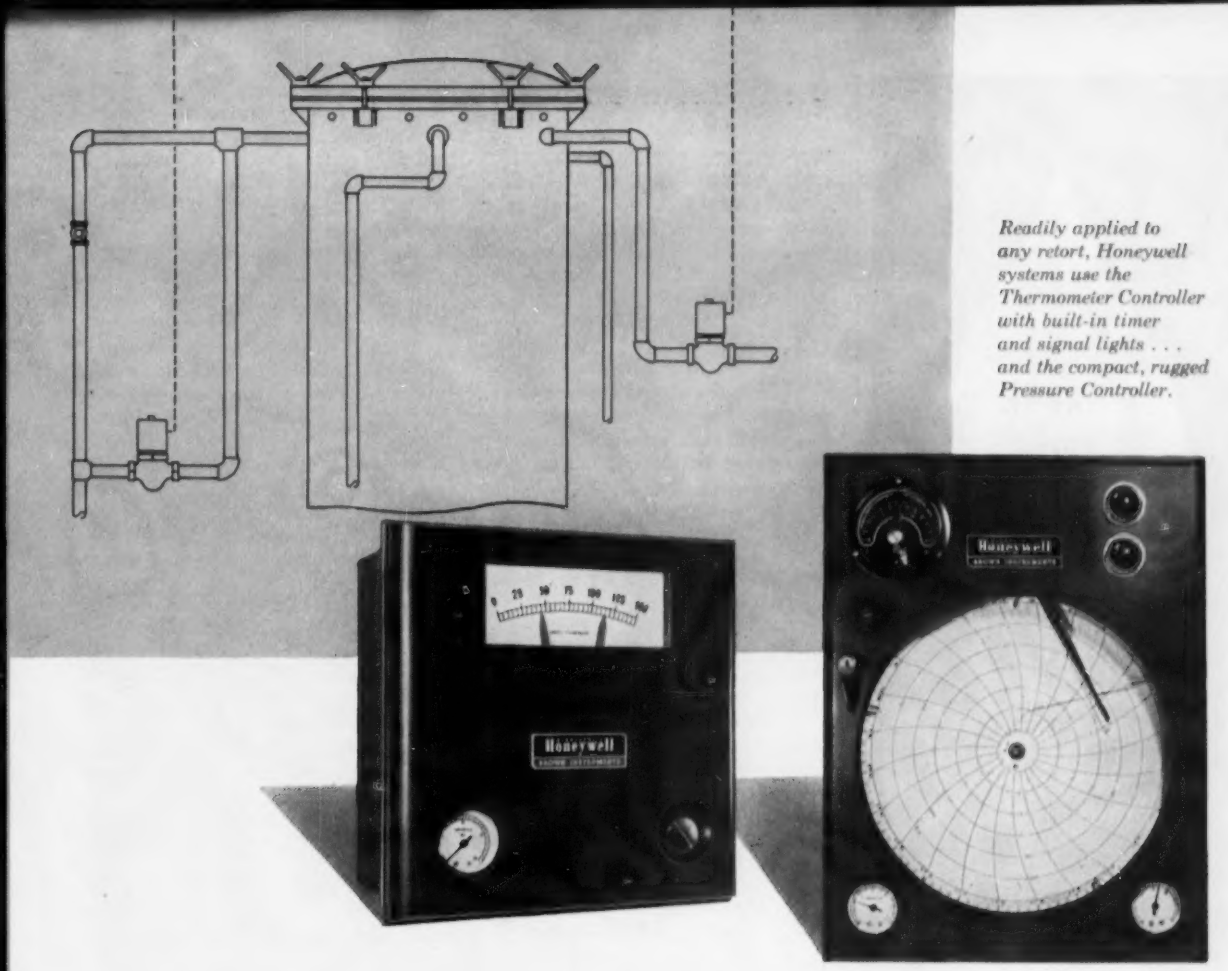

Readily applied to any retort, Honeywell systems use the Thermometer Controller with built-in timer and signal lights . . . and the compact, rugged Pressure Controller.

Honeywell control systems

IT'S EASY to put a big dent in production costs, when you add Honeywell control systems to your vertical retorts.

These packaged control systems allow you to use your retorts and manpower to the best advantage. Once you have set the cooking cycle you want, the instruments take over. They bring your retorts up to process temperature quickly, hold them there accurately for the specified time, then immediately start the cooling action. No more wasted time and motion . . . no more costly over-processing . . . no more guesswork in your retorting operation.

Yet, the first cost is low, and can be quickly repaid by the savings the systems make possible. The systems can be installed by your plant electrician. Or, even easier, you can order Honeywell-engineered panelboards, wired and piped at the factory, or unmounted . . . at your option. And you can change your control system by merely adding minor accessories, because these systems are built around the same basic instrument and use standard components.

There are systems to fit any retort and every process: —systems which automatically control steam or water cooking—systems with automatic venting . . . automatic blowdown . . . pressure cooling . . . or combinations of these. Cycles can be set for any cooking time from a few minutes to three hours. The automatic venting system, based on minimum time and temperature, conforms to the recommendations of the Research Laboratory of the National Canners' Association.

Find out how Honeywell controls can go to work on your canning problems. Just call your local Honeywell sales engineer . . . he's as near as your phone.

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BROWN INSTRUMENTS
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- Outperform crude spices
- Assure uniformity of flavor
- Measure easily — mix easily
- Eliminate spoilage
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Write for the new MM&R booklet — "The Greatest Advance in Food Seasoning."

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Need for Technologists

—*Continued from page 51*

lectures by company executives, films, slides, "buzz sessions" (small group discussions), outside reading and private study, lectures by outside speakers, case studies, panels, forums, role playing, and workshops.

On the Civic Side

More and more, the forward-thinking companies are endeavoring to promote the management qualities in their employees by encouraging them at every level, from bottom to top, to participate in civic activities.

Their justification is the well-founded belief that there is no better way to learn to manage than to manage. And outside civic activities provide many opportunities to manage, according to the ambition and ability that can be mustered by the individual.

A technical man's road up through management is, first of all, through individual study and training along the lines of the subjects mentioned, and with practice in the things learned.

If "practice" on the job and in the plant is limited, then civic and community activities, where participation is open, may be the answer.

End (*Resume reading on page 52*)

Probing New Methods

—*Continued from page 64*

Any maintenance needed is termed very low and easily accomplished. Normally, only periodic inspections are necessary for maximum operation.

MYLAR BELTS

How the unusual requirements of the ideal cooling tunnel are met by the new Mylar belt was pointed out by C. Robert Morrison, Mohawk Supply Co., Philadelphia.

Tensile strength of this belting, as currently being used in a 6 mil thickness, is 150 lb. per inch of width. This strength compares favorably with that of two-ply woven fabric. The new belt has more than enough ruggedness to do the job under actual operating conditions.

Mylar's flexibility is very high. And when used as conveyor-belting, this material bids fair to afford greatly increased belt-life by eliminating failure due to excessive flexing.

Tests show that 6-mil. Mylar withstands 120,000 flexures which, when computed on the basis of a 100-ft. long cooling tunnel and a belt speed of 10 fpm., figures out to more than 10 yr. of continuous operation without damage from excessive flexing.

Resistance to abrasion is not one of Mylar's outstanding properties. Severe abrasion will scratch its surface, just as any other belt. However, since only the under side of the belt is subjected to abrasion in going around nose bars, this lack is not a drawback.

After six months' operation, tunnel belts, although scratched on the under side, have shown no evidence of wearing thin, and will last a long time.

Stability of Mylar is exceptional. It will not stretch until stresses of more than 100 lb. per inch of width are applied. It remains completely unchanged within a temperature range from −40 to +60F., and shows no variation in dimensions when subjected to a 20 to 92% humidity range.

This means Mylar will remain completely unchanged in length and width under all possible variations in temperature and humidity.

While this material is a good heat insulator, it still has less insulation value than any fabric. Since this is so, faster cooling can be obtained by an increase of heat transfer through the belt.

The slick surface of this material is possibly its greatest property. It is completely smooth without any grain or uneven texture, and it thus gives a high gloss bottom to chocolate pieces.

Not being a coating, but the actual Mylar itself, the high gloss surface will not wear away but will continue to give consistently glossy bottoms to processed pieces.

Resistance of Mylar to oil and grease is excellent. Immersed for two months in penetrating oil, lard, cottonseed oil, and similar substances, it showed no adverse effect. In actual tunnel-belt applications, it revealed no effect from contact with cocoa butter after six months.

This material qualifies as non-absorptive, since it is a plastic and, unlike a fabric, does not "take on" liquids. After a week in water, it absorbed less than 0.3% by weight.

It also remains completely free of cracks, due to its great flexibility, its stability (which prevents cracking caused by stretch or shrink in operations), and its resistance to oils and greases.

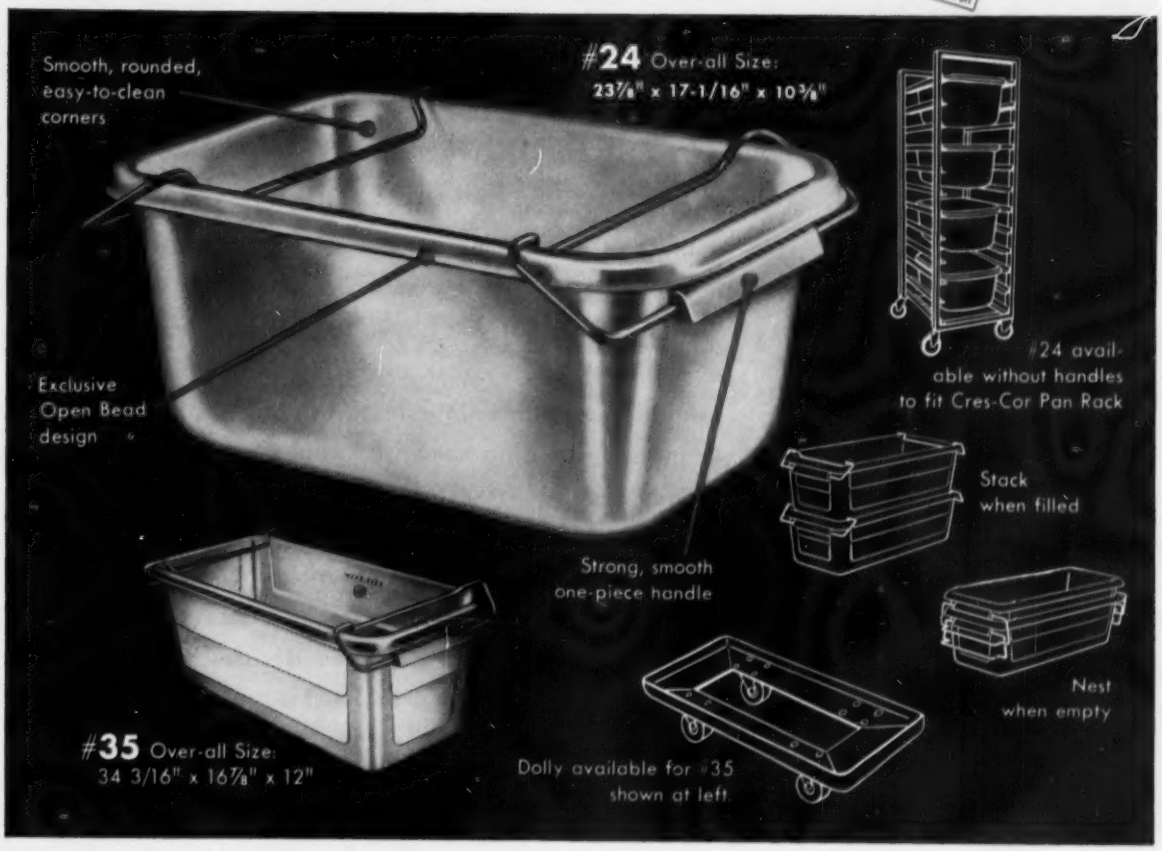
Concluding Part II, scheduled for an early issue of FE, will highlight PMCA findings on the advantages of newer fats, control of liquefaction of cordial fruit cream centers, and the progress in candy-mold practice.

End (*Resume reading on page 65*)

now . . . handy smaller size . . . new features

Tote Boxes

by WEAR·EVER


Smooth, rounded, easy-to-clean corners
#24 Over-all Size: 23⅞" x 17-1/16" x 10⅜"
#24 available without handles to fit Cres-Cor Pan Rack
Exclusive Open Bead design
Stack when filled
Strong, smooth one-piece handle
Nest when empty
#35 Over-all Size: 34 3/16" x 16⅞" x 12"
Dolly available for #35 shown at left.

You asked for it . . . a smaller version of the famous Wear-Ever #35 Tote Box. It's our new #24, shown at top in the above illustration, and it's available *now*.

We've designed it particularly for you whose needs call for a lighter, smaller, easier-to-handle container. It is available without handles, to fit perfectly in a Cres-Cor pan rack.

This new box incorporates the same quality construction features as our standard size box—special extra hard wrought Wear-Ever Aluminum Alloy, sanitary open bead and extra strong, double-embossed bottom.

Like its big brother, shown in the smaller photo, this new box stacks when full, nests when empty and is available with your identifying imprint on side or end, if desired.

For full information on our complete line of food handling items, call your local Wear-Ever man, or send coupon below.

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ADVANCES IN TECHNOLOGY

Rolls From Frozen Dough

Manipulation of doughs after storage is the most important factor in obtaining satisfactory quality in yeast rolls made from frozen doughs.

In experiments with fermented and unfermented doughs, rolls made from the latter, that was frozen unshaped then shaped after thawing, were of better quality than fresh rolls through 4 weeks of frozen storage. They were equal to fresh rolls through 12 weeks of storage.

When fermented dough was shaped or reshaped after 2 and 4 weeks of freezer storage, quality of resulting rolls was comparable to that of rolls from fresh fermented dough. Beyond 4 weeks quality of frozen dough rolls was inferior to fresh ones, but still was equivalent to those from unfermented dough that was shaped after freezing.

Greatest decrease in quality (score 63) occurred in rolls from fermented dough shaped before freezing. Rolls had reduced volume, blistery crusts that browned excessively, coarse grain with compact layers and harsh, dry texture. — *Food Technology*, 165-68, April, 1956.

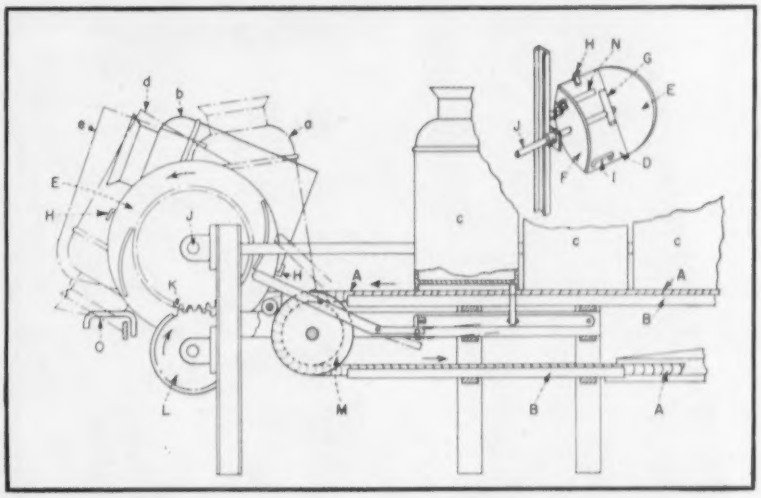
New Browning Inhibitor

Enzymatic browning of various fruits and vegetables when peeled, cut, or pulped can be controlled to a large extent by treatment with adenosine triphosphate, as revealed in a recent patent.

Although the theoretical reason for this action is not known, the practical results are well established. Preferred method of treatment will vary with the fruit or vegetable, its physical state, and the manner in which it is to be preserved.

In the case of potatoes, for example, the tubers are peeled, washed, and dipped in an aqueous solution of adenosine triphosphate ranging in concentration from 0.06-6.0%. When removed from the bath, drained, packaged in waxed cartons, and refrigerated at 32-50 F., they will retain their natural color for a week or more, depending on concentration of the inhibitor.

Inasmuch as adenosine triphosphate is a normal constituent of most living tissue, it will not detract from the nutritive value, flavor, or color of the food.–U.S. Patent 2,738,280, March 13, 1956.



Unit Automatically Dumps Milk Cans Then Delivers Empties to Washer

A new and improved system for handling and dumping cans of milk is covered by a recently patented invention.

System comprises a conveying mechanism for moving both full and empty cans, and an inverting unit for dumping their contents into a receiving tank.

An endless chain (A in drawing above) sliding on channel-shaped guide tracks (B) is used to feed filled cans to the inverter and to move clean ones from discharge end of washer. Separate loading and unloading stations are provided for placing filled cans on the chain and removing empties from it.

Inverter comprises platform (D in inset) with side flanges (E & F) and intermediate flanges (G) perpendicular to it. Platform also has two oppositely disposed hooks (H) and two can supports (I), giving each of its faces identical parts.

Platform is fastened to shaft (J) which turns in bearings of unit's frame. Mounted on this shaft is gear (K) which meshes with driven gear (L) to keep inverter plate in continuous rotation.

In operation, roll (M) transfers filled can from conveyor (A) to inverter platform (D) and places it between side flange (F) and one of the intermediate flanges. Bottom rim of can is over hook (H) and inner end of its neck is engaged by can support (I). Inverter then turns can from position (a) to (b, d, & e), respectively, and dumps its contents into large tank below.

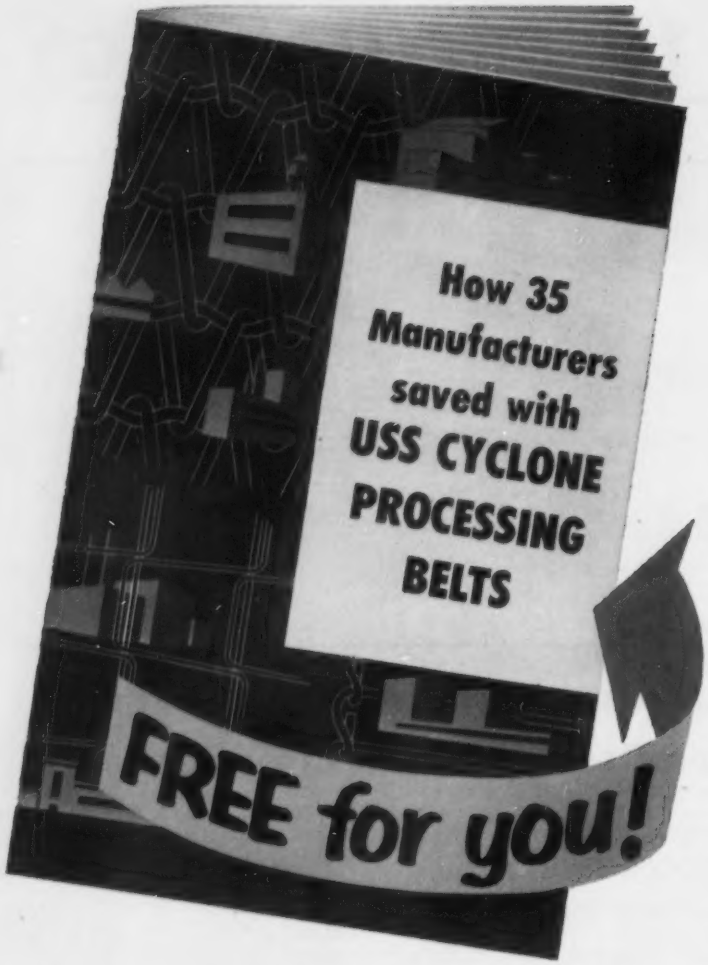
When in position (d), can is rapidly tilted forward by lever (N) to mechanically eject its contents. In this position its mouth rests on bar (O). When can reaches outlet position (e) hoop-shaped transfer rod (P) moves it across bar (O) and out of the inverter. Here it is engaged by a carriage that feeds the can into the washer. When platform (D) moves 180 deg., another can is moved into position on the inverter.

Removal of lids from filled cans is done manually at the inspection station just before cans are fed to the inverter. Gate is provided in guide bar at this location for removal of rejected cans. Also provided at entrance to inverter is a cam-actuated stop to control movement of cans into it.–US Patent 2,726,779, Dec. 13, 1955.

Vitamins in Instant Milk

Conversion of a low heat nonfat dry milk to an instant product by reprocessing does not measurably change the thiamine, riboflavin, nicotinic acid, pantothenic acid, or vitamin B_6 content.

Ascorbic acid content may be slightly decreased by the conversion, but, as milk is not a dependable source



A book on production line savings...

Here are specific stories of how thirty-five prominent manufacturers managed to cut down on production costs by using Cyclone Processing Belts. In each case, costs slid down when Cyclone Processing Belts started up.

Send for this *free* booklet illustrating actual techniques and uses of production line methods. It's chock full of ideas that add up to dollar and cents savings. We've chosen each example carefully to cover as many fields as we could. You'll find Cyclone Processing Belts used in acid, heat, water, brine and many other operations. Just clip the attached coupon and mail it. It will pay you to do it . . . TODAY!

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UNITED STATES STEEL

of this vitamin, the loss is unimportant.

And protein quality of the product, as measured by rat growth, is equal to that of the low heat powder from which it was prepared or to that of pasteurized milk.

These results were obtained from reconstituted samples of two nationally distributed brands of instant dry milk.—*Food Technology*, 221-24, May, 1956.

Continuous Butter Process

Butter can be produced continuously from plastic cream of not less than 80% fat content by adding thereto a small percentage of butter and subjecting the combination to simple mechanical mixing. The reversion of phase proceeds in a short time, varying from one to several minutes.

According to the patented invention, the mixture of plastic cream and butter is pumped through a pipe containing a succession of mixing devices that produce a homogeneous product. Preferred form of mixer is a disk about 1 in. thick provided with holes about 0.1 in. in dia. with axes in different directions. By repeatedly pressing butter and plastic cream through a series of these disks, intimate mixing is achieved.

Apparatus is also provided with means for recycling a portion of the finished product, so that once the operation has begun it can be continued as long as desired. Satisfactory results are obtained by mixing 20-30% butter with plastic cream at a temperature of 70-80 F. With suitable modifications, sour as well as sweet cream may be used. It is claimed that oiling off is less and firmness greater than that of butter made in the traditional manner.—U. S. Patent 2,729,563, Jan. 3, 1956.

Shows Keeping-Quality Of Pasteurized Milk

Reduction of neotetrazolium dye to a pink color is the criterion for a positive test for presence of psychrophiles, that will result in poor keeping-quality of pasteurized milk under refrigeration.

To make the test, dye and milk are mixed in an incubation tube which is evacuated, sealed, and incubated at 37 deg. C. for 4 hr. Development of a pink color positively predicts spoilage within 3-4 days.

Heretofore, dye reduction tests for measuring keeping-quality of pasteur-

for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

JENKINS NICKEL IRON Valves with Type 316 STAINLESS STEEL Trim

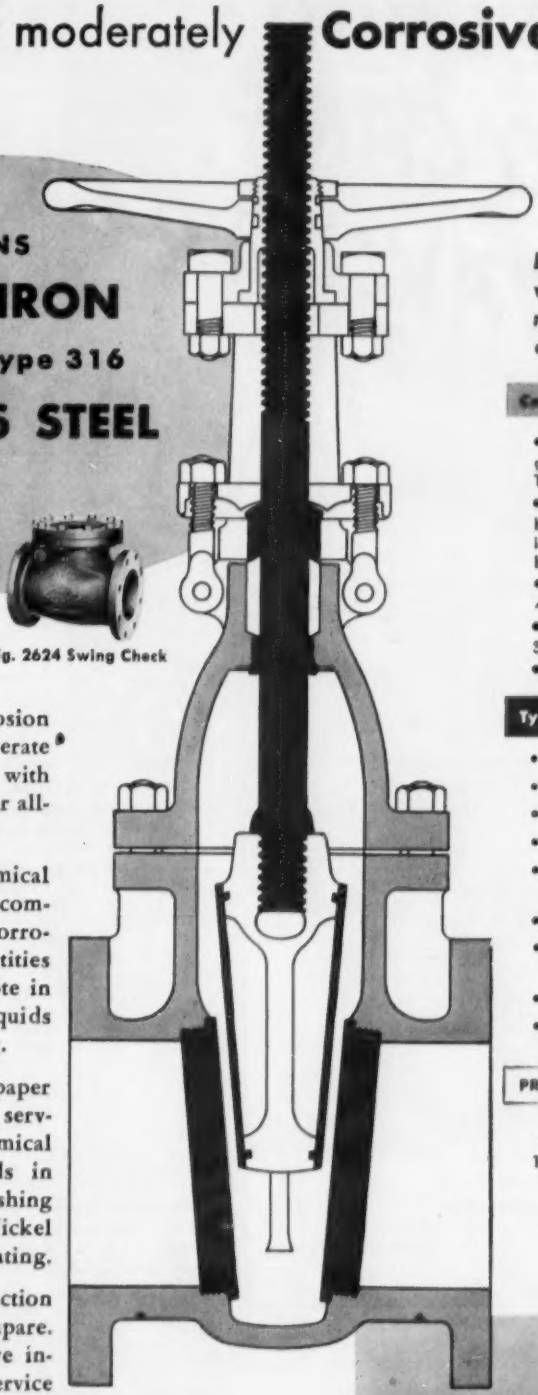


Fig. 2624 Swing Check

Every part in contact with fluid is the right metal to block corrosion and beat wear.

Cast NICKEL IRON

- **BODIES** Heavy duty, dimensioned for greater resistance to wear and abuse. Through port design in Gate Valves.
- **BONNET** Rugged construction, like body. Swing-type gland bolts. Screwed-in back-seating bushing. Deep stuffing box.
- **YOKE** Integral with bonnet in 2" to 4" sizes.
- **WEDGE** In 10" to 24" sizes, with Stainless Steel Wedge Rings.
- **COVER** In Check Valve.

Type 316 STAINLESS STEEL

- SPINDLE
- GLAND
- BONNET BUSHING
- SPINDLE WING
- WEDGE of I-beam structure in 2" to 8" sizes.
- WEDGE PIN
- WEDGE RINGS Rolled into Nickel Iron Wedge in 10" to 24" sizes.
- SEAT RINGS
- DISC and HANGER in Check Valve

PRESSURE RATINGS

2" to 12"—200 lbs. O.W.G.
14" to 24"—150 lbs. O.W.G.

This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

A major use is in pulp and paper processing, particularly in lines serving the digester, and in the chemical recovery cycle. Service records in lines carrying the valve-punishing "black liquor" give Jenkins Nickel Iron Valves top performance rating.

Jenkins *extra value* construction throughout. Get details — compare. See why they stretch your valve investment dollar — with longer service life, lower maintenance cost.

ALSO RECOMMENDED for fluids used in electroplating, photograph finishing, textile bleaching, dyeing and finishing and heat treating of metals.

GET COMPLETE SPECIFICATIONS from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 118.

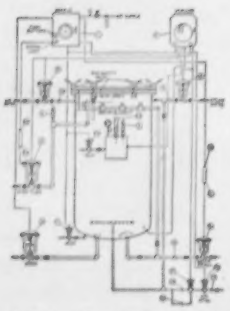
JENKINS VALVES

LOOK FOR THE DIAMOND MARK

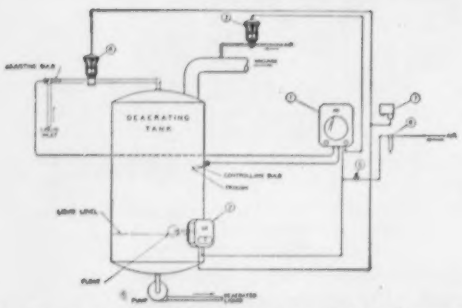
SINCE 1864 TRADE JENKINS MARK

Jenkins Bros.

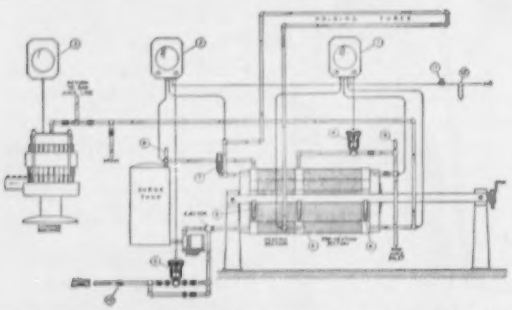
"'TIS CANNY TO CAN WITH TAYLOR-R-R"



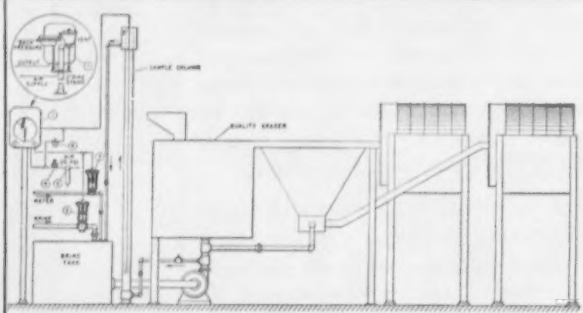
Taylor SPW-7AV Retort System—completely new and automatic—controls steam or water cooking, with or without pressure cooling. Adaptable for any existing variety of products.



Taylor Deaerator Control System gives efficient deaeration, minimum loss through water evaporation. Reduces oxidation and discoloration—improves product's keeping quality and appearance. Prevents separation of pulp and liquid.



Taylor Juice Heater Control System gives a uniformly higher quality juice of consistent purity, optimum flavor, and vitamin retention. Final juice temperature maintained even during complete flow stoppage.



Taylor Brine Density Control System in this flotation grader keeps solution within close limits for maximum yield of top quality peas. FULSCOPE* Recording Controller regulates brine or water valves to maintain required density.

HERE are four popular ways modern canners use Taylor Control Systems to cut costs and build quality. Today's competitive market makes efficiency a must—Taylor's field-experienced engineers make efficiency a science. Automatic Control Systems have been developed for every key process in the plant. Ask your Taylor Field Engineer or write for **Catalog 500.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

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Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

ized milk under refrigeration have been too slow to yield results within a reasonable incubation period. It was found, however, that the time required for dye reduction could be greatly decreased by evacuating the tubes and maintaining vacuum during incubation. Procedure increases the sensitivity of the dye by removing much of the oxygen.

Recommended procedure: Pipette 0.5 ml. of 0.2% aqueous solution of neotetrazolium into a dry sterile incubation tube; add 5 ml. of the milk; mix and temper contents to between 0 and 5 deg. C. Evacuate tube at 15 mm. pressure for 3 min. and seal. Temper to 37 C. and incubate 4 hr., after which look for development of pink color.—*Journal of Milk & Food Technology*, 63-66, March, 1956.

Wax and Plastic Coatings Protect Wedges of Cheese

By dip-coating a segment of cheddar cheese with a waxy material and wrapping the article in cellulose acetate or similar film, a patented package is formed that, not only protects the food until it is sold, but can be repeatedly opened for removal of part of the contents and closed again for the continued protection against spoilage.

The wax must have a suitable melting point, be capable of adhering to the cheese but have greater adhesion to the wrapping material, and congeal to the point where it will break rather than bend when the wrapping film is sharply bent.

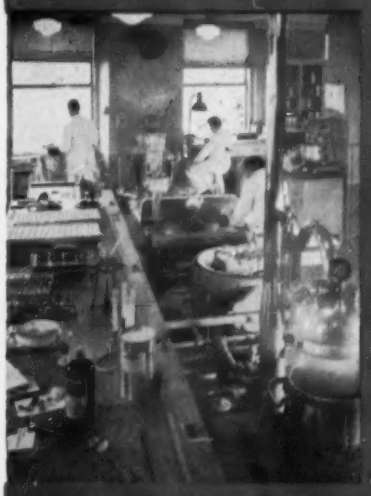
Preferred formula is 80 parts microcrystalline petroleum wax of which ¾ has a 155 F. mp. and ¼ melting point of 130 F. The remaining 20 parts comprise ¼ poly-isobutylene, commercially known as Vistanex, ¾ fully refined paraffin mp. 133-135 F. Combination is maintained at 175 F. and cheese is dipped in it either mechanically or manually. Two coatings are preferable.

In the mechanical coating, cheese segments are impaled on pegs attached to a carrier that may be hung on a chain conveyor and carried through successive steps of first and second coatings followed by cooling. Coated food is then wrapped in plastic outer film which is heat sealed.—U.S. Patent 2,733,151, Jan. 31, 1956.

Plastic Package for Individual Servings

Sheets of thermoplastic material, such as vinylite, are used to form cup-like containers for individual servings

LOW-COST PRODUCT PROTECTION



For over forty-five years **NULOMOLINE**®—*the pioneer* invert sugar—has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

NULOMOLINE is hygroscopic . . . attracts, retains, and equalizes distribution of moisture . . . retards crystallization . . . increases osmotic pressure . . . stabilizes density of syrup portion . . . resists fermentation . . . controls texture and consistence . . . promotes product uniformity . . . improves taste and appearance.

USE NULOMOLINE . . . THE LOW-COST HYGROSCOPIC HUMECTANT . . .

Packed in large and small containers—
in tank wagons and tank cars.

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Write, phone, or call and discuss your problems in confidence with **NULOMOLINE SERVICE.** Our technical and practical staffs are *at your service!*

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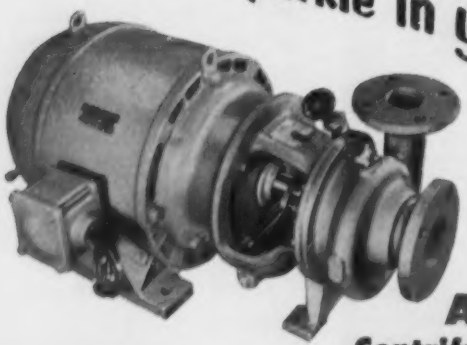
Keep the sparkle in your beer



AMPCO*
Centrifugal Pumps

...inhibit foaming and degassing, help lock flavor in

That's right! Ampco Pumps have the proper characteristics to prevent foaming and degassing. That's why they help your beer keep its sparkle.

But that's not the only reason these versatile pumps are ideal for all types of brewery work. For one thing, these pumps are built completely of Ampco Metal—a copper-base alloy that has no zinc or lead to form toxic salts.

And just as important, there's no micro-shrinkage in Ampco alloys. Beer under pressure can't impregnate these pumps. Yeast and protein can't settle into the unit to decompose and taint the flavor. You always assure yourself of maximum cleanliness.

And get this. Ampco Centrifugal pumps have unusual resistance to corrosion and erosion. Filter aids pass through them without causing wear. And ordinary brewery cleaning agents have no effect on them.

You can get Ampco Pumps with mechanical seals for both slurries or clear products. Or, if you want to keep oxygen out of your beer, you can get flushed mechanical seals. And you can get either 1750 or 3500 rpm units with capacities to 600 gpm, heads to 300 ft. Write today for latest literature.

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Sole producer of genuine Ampco Metal

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P-18

of jam, jelly, peanut butter and the like, according to a recent invention.

In the process, a strip of plastic is subjected to heat, pressure, and suitable forming dies to make a succession of cups which, when filled with the desired material, are covered with an elastic material, such as pliofilm. The covering film is sealed to flanges of the cups by application of heat and pressure, and each cup is sheared from the strip as soon as it is sealed.

For a cup 2 in. square the plastic material may be as thin as 0.01 in., and may be drawn to a depth sufficient to hold from ½-1 oz. The cover may be as thin as 0.002 in. Packages will withstand refrigeration and normal service conditions, as well as reduction of external pressure encountered in flights at altitudes of 5,000-10,000 ft. It is easily opened with the fingers by stripping the cover from the cup.—U.S. Patent 2,736,656, Feb. 28, 1956.

Aids Filtration-Extraction

Solvent cooking of the raw, rolled cottonseed meats permits three processing steps to be combined in one, when using the filtration-extraction method.

This was indicated by results of experiments conducted at SRRL. In these experiments, the raw, rolled meats were mixed with solvent (hexane or heptane) and sufficient water (containing added chemicals), then resulting slurry was subjected to a combined heating and azeotropic distillation to reduce moisture content to an optimum value.

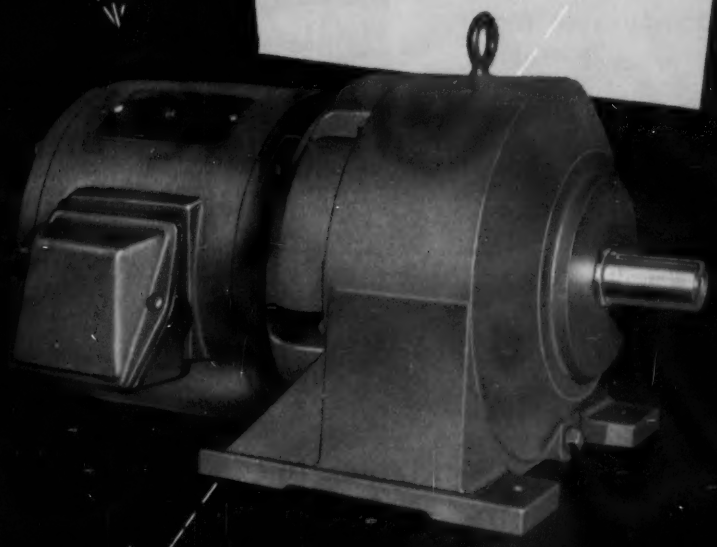
Results showed that: (1) An increase to 30% in initial moisture content gave mass velocities above the desirable 2,000 lb./sq. ft./hr.; (2) free gossypol content of extracted meals is lower with higher moisture content, and with additions of NaOH + $CaCl_2$, and (3) addition of NaOH + NaCl resulted in better overall filtration-extraction than either the NaOH + $CaCl_2$ or the NH_3 + NaCl combination.—*Journal of the American Oil Chemists' Soc.*, 177-80, April 1956.

Accumulated Detergents Affect Water Supplies

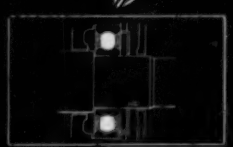
Synthetic detergents pass relatively unchanged through sewage disposal processes and, in regions where there is much reuse of water, they can accumulate in water supplies.

Such conditions have occurred in the Chicago area of Lake Michigan, the Ohio river, the Clinton river of New York, and in other places. These

Don't overlook what you can't see

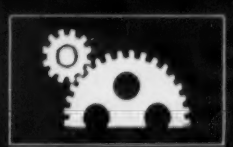


You can't always see what makes a gearmotor outstanding. It's the attention paid to small design details that makes the difference. Here are a few of the details that make the new Reliance Gearmotor stand above the rest.



FOOLPROOF METERMATIC motor bearing lubrication and oil bath gear lubrication for long-life protection against wear.

INDUCTION HARDENING of the tough alloy steel gears gives a perfect combination of wear resistance and strength.



SIMPLIFIED GEARING with few moving parts reduces friction losses and lessens chances of breakdown.

THRUST BEARINGS handle heavy overhung loads safely by placing strain on the frame instead of the shafts.

Find out the complete story for yourself — contact your Reliance representative or write for Bulletin E-2408.

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Canadian Division: Welland, Ontario

Tested and proved...

by critical users . . .
by time . . .
by varied applications

How these big producers profit with Pfaudler Piston Fillers

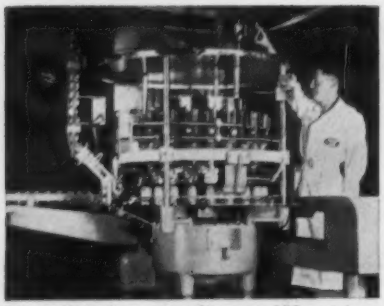
These companies are successfully processing everything from semi-frozen juices to potted meats. They fill tin, glass or composition containers in a variety of shapes and sizes. All use Pfaudler Rotary Piston Fillers. All get fast, accurate filling.

For example, H. J. Heinz gets a breathless 800 cans per minute (has run 1050!) filling baby food with a Model RP-35. Production rates are correspondingly high with 7-, 14- or 21-station Pfaudler Fillers. Even gallon containers can be filled at 100 per minute, using the 7-station RP-7.

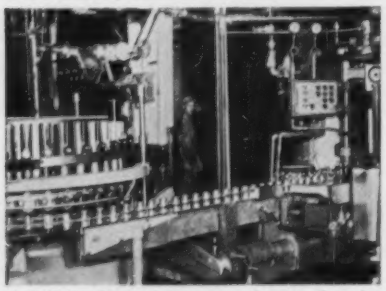
Mechanical efficiency is a profit factor, too. Pfaudler Fillers are accurate to within ±1/10 oz. No-can-no-fill device prevents waste, keeps machine and containers clean. Model RP-35, equipped with an electric brake, stops rotation within 2/10 of a second.

Because spillage is avoided, cleaning is less of a chore. Valves and pistons slide out easily for fast cleaning and visual inspection. One man can do the whole job in 30 minutes. He needs no tools either.

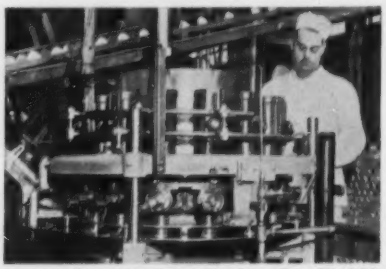
The speed and efficiency of Pfaudler Rotary Piston Fillers have been proved and tested in nearly 10 years of operation by leading names in the food industry. You, too, may profit from the speed, low maintenance and low operating cost of Pfaudler Fillers. Complete data on models and speeds is in Bulletin 911. Send for it today.



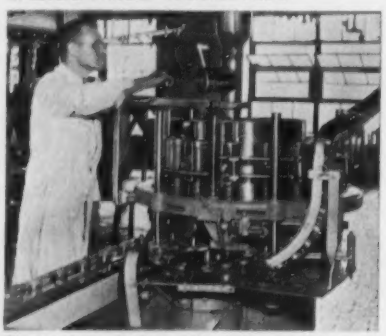
Minute Maid Corporation fills up to 600 containers per minute with Pfaudler 21-station Fillers. 1/10 of an oz. accuracy keeps costs low.



H. J. Heinz Co., at Leamington, Ontario, Canada, fills more than 800 cans of baby food per minute with 35-station Pfaudler Filler, world's fastest.



Hershey Chocolate Corp., Hershey, Pa., fills 300 five-oz. cans of chocolate syrup per minute on each of several Pfaudler 14-station Fillers.



Kingan & Co., Indianapolis, Ind., uses 14-station filler for potted meats. Machine is rated at 150 to 400 cans per minute.

THE PFAUDLER CO., Dept. FE-6, Rochester 3, N. Y.
Please send me, without obligation, your fact-filled booklet "Rotary Piston Fillers," Bulletin 911.

Name_____ Address_____

Title_____ City_____

Company_____ Zone____ State_____

THE PFAUDLER CO. • ROCHESTER 3, N. Y.

waters may have abnormal moldy or mildewy odors and tastes, and floc coagulation and settlement may not occur during treatment of them.

Removal of detergents from water supplies has been studied at the South District Filtration Plant, Chicago, where it was found that Cl_2O_2 reduces the odors associated with the water, but high dosages are necessary. This is also true of activated carbon. Aluminum sulfate, activated silica, and chlorinated ferrous sulfate had limited effectiveness.

Sediment concentrated by additional settling for an hour, or sediments from iron-lime or other treated waters are the most effective removal agents for detergents. Precipitated calcium carbonate and bentonite have some removal power. The removal is a surface adsorption phenomenon, and surface active agents in commerc detergents are partly responsible for the problems of detergents in water supplies.—*Ind. & Eng. Ch.*, 241-45, 1956.

Egg Substitutes

Products that can be substituted for egg in the manufacture of sponges, cakes, and other baked goods are the object of a recent patent.

These products are made by mixing a Ca sequestering agent with skim milk, casein, or casein with minor amounts of lactalbumin and lactglobulin in the acid range, then adjusting the pH to approximately 7 by addition of an alkali. All steps are carried out at temperatures below 140 F.

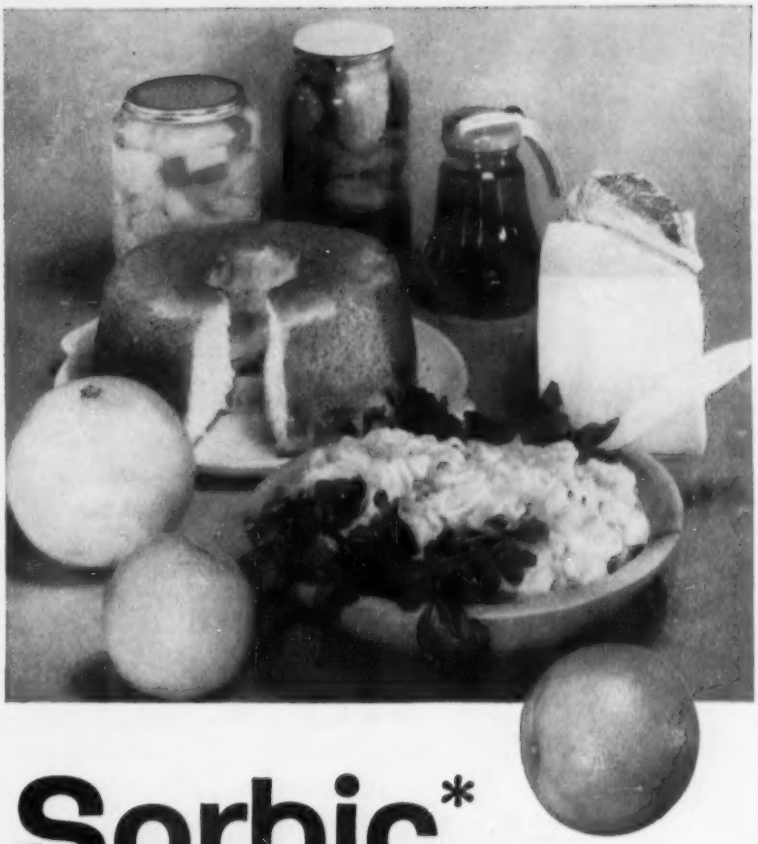
The sequestering agent may be selected from a group consisting of alkali metal pyrophosphates, metaphosphates, polyphosphates, and citrates.—US Patent 2,739,898, March 27, 1956.

Low-Methoxyl Pectins In Berry Canning

Addition of a small quantity of low-methoxyl pectin to syrups used in canning berries has practically eliminated deterioration in color and flavor, as well as prevented breakdown of the fruit in transit.

Following disappointing results with calcium pectinate gels, a procedure was established for producing acid gels that has proved very satisfactory.

Recommended process is to dissolve the pectin in syrup, then add a citric acid solution (to reduce the pH of the berries slightly) to cans before syruping. No major alterations were necessary in canning lines. Citric acid is dispensed in cans of fruit by a simple



Sorbic*

the modern food preservative

protects natural quality...

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CAKES
PICKLES
SALADS
CITRUS PRODUCTS
SIRUPS

- Controls growth of many molds and yeasts.
- Safe at required levels—it is metabolized like fatty acids in foods.
- Contributes no flavor or odor—when properly used.

For further information on how you can protect your food product with Sorbic, write the CARBIDE office nearest you for Technical Bulletin F-6568. Offices in principal cities. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

*CARBIDE's *refined sorbic acid for use in foods.*

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Don't be fooled about food wrappers

correct packaging calls for wrappers that have wet-strength as well as grease-resistance

HERE'S WHY – most foods contain *both* moisture and grease. So doesn't it stand to reason that for best protection you need a wrapper that has wet-strength and at the same time resists grease? **Patapar Vegetable Parchment** has *both* qualities.

NOTE FIGURES FROM U.S. DEPT. OF AGRICULTURE (CIRCULAR NO. 549):

	Water Content	*Grease or fat content*
BACON	20%	65%
BEEF	60%	22%
BUTTER	15.5%	81%
CHICKEN	66%	12.6%
CREAM CHEESE	53.3%	36.9%
DUCK	54.3%	28.6%
HAM	42%	35%
MARGARINE	15.5%	81%
PORK LOIN	52%	32%
SAUSAGE	44.8%	41.2%
TURKEY	58.3%	20.2%
VEAL	68%	12%

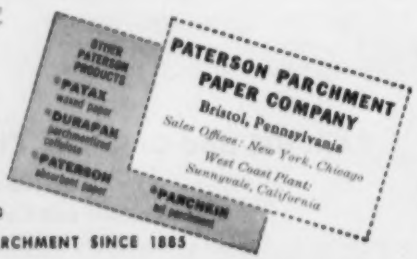
These are just a few of the hundreds of foods that need the protection of a wrapper, like Patapar, that has WET-STRENGTH as well as GREASE-RESISTANCE.

Patapar is NON-TOXIC and meets every requirement of the Federal Food and Drug Act. It is made in many different types – each tailored for special applications.

Patapar provides sure protection —sales appeal, too!

Patapar's rich, white texture is fresh looking and appealing. It comes in sheets or rolls – plain or colorfully printed. Our printing service includes sketches, art work, typography, engravings. Special inks are used that are colorfast and non-toxic.

Tell us your requirements so we may select the type of Patapar for your application.



Patapar
Vegetable Parchment
HI-WET-STRENGTH • GREASE-RESISTING

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

metering device, then syrup is added. Due to its greater viscosity, latter is best added by a vacuum syruper. Cans are then closed and steam-processed.

Berries thus packed are very attractive, with the syrup adhering to them for at least 2 hr., conferring a glossy appearance and enhancing their color. Berries show less shrinkage and are smoother. In shipping tests, raspberries were transported by boat from Tasmania to the United Kingdom and back, without loss of their whole form, as against noticeable disintegration of berries packed in ordinary syrup.—*Food Preservation Quarterly* (Australia), 11-13, March 1956.

Aureomycin Doubles Life Of Herring in Storage

Simplest way to extend keeping time of herring is to hold the fish in aureomycin-ice after landing. When a relatively long time elapses before the ship gets to port, however, storage in an aureomycin solution on board, followed by the antibiotic ice is recommended.

These facts were determined by experiments conducted in Japan using a boat equipped with 4 tanks containing sea water. To 3 of the tanks, aureomycin (to give concentrations of 10 ppm.) was added. Two of these were cooled by addition of aureomycin-containing ice, the third by plain ice. Fourth tank contained plain sea water and plain ice.

Catches were equally divided between the 4 tanks. On arrival in port, they were transferred to boxes and iced—those from the first 3 tanks with aureomycin ice, the fourth with plain ice—then separated into two categories. First group was stored at 60-70 F., the other at approximately 32 F.

The combination of sea water-aureomycin plus antibiotic ice prolonged storage life of the fish held at 60-70 F. approximately 90% over controls. At 30-34 F. the above treatment extended keeping time at least 40%, or approximately 5 days.—*Food Technology*, 215-18, May, 1956.

Curing Meats in Vacuum

Apparatus has been patented for curing meats in vacuum by de-aerating the cells of the meat and thereafter allowing curing brine to enter the cells.

A feature of the invention is the application of pulsating cycles of maxima and minima pressure within the range of a vacuum. The apparatus automatically generates a plurality of

such cycles of predetermined time and pressures.

A cylindrical curing tank is connected through its cover with a source of vacuum. The cover also carries a breather valve that can be adjusted to break the vacuum at a desired pressure. Bottom of the tank is a sheet of natural rubber which separates the tank from its cylindrical support. Meat to be cured is placed on this rubber diaphragm.

In operation, vacuum is applied to the tank and brine flows in, completely immersing the meat. When the desired low pressure is reached, the breather valve breaks the vacuum and allows the pressure to rise to the desired high point. The vacuum pump again reduces the pressure, and this cycle is repeated as long as desired.

Time of a complete cycle ranges from 1-3 min., and total time of treatment from a matter of minutes to hours. An alternative method of curing is to inject curing solution into the center of pieces of meat by means of a hypodermic needle, and treating such pieces without immersing them in brine. Or both methods may be used in combination.—U.S. Patent 2,742,367, Apr. 17, 1956.

Temperature Changes In Freezing Liquids

Heat transfer concepts applicable to freezing or thawing of fruit juices have to consider a 2-phase system, ice and solution. Heat flowing into or out of the system can alter both the amount of ice and solution concentration.

Using the fact that juices are generally packed in simple cylindrical containers, and assuming that heat flow is radially only, a second order partial differential equation relating temperature and time can be developed. While this cannot be integrated directly, graphic integration is possible by dividing radius of cylinder into equal increments.

When calculated values were applied to frozen concentrated orange juice of 20, 40, and 60 deg. Brix, time-temperature curves agreed very well with experimental values.

The thermal conductivity of freezing orange juice as a function of temperature varies from 0.3 to 2.0 (Btu.) (ft.)/(hr.) (sq. ft.) (deg. F.) between 28 and −20 F. Curves for different concentrations are by no means parallel though they have a certain similarity. Values for density, specific heat, and thermal conductivity obtained for orange juice should also serve as reasonable estimates for other fruit and vegetable juices.—*Ind. & Eng. Ch.*, 188-96, 1956.

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modify starches at low cost

RHOZYME Diastatic Enzymes bring about specific, controlled action without producing undesirable side reactions. This lets you solubilize, saccharify, or modify food starches without sacrificing other properties vital to good products or processing.

This selective action of the RHOZYME family makes them a low cost, efficient answer to processing problems such as:

PROCESSING OF PRE-COOKED CEREALS—by reducing viscosity of mash for more efficient roller-drying

PRODUCTION OF CORN SIRUP—by saccharifying corn starch in making sweet, non-bitter sirups

PRODUCTION OF COCOA SIRUPS—by lowering viscosity so that sirups pour readily

BREAD-MAKING — by modifying bread starch to give better texture and grain and better shelf life

How can RHOZYME Diastatic Enzymes help you? To find out, write Department SP.

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with DEMING Turbine Pumps

A wide variety of liquids are handled by Deming Vertical Turbine Pumps in diversified industries. Advantages over conventional pumps in comparable services include the following:

COMPACTNESS: A Deming Turbine with a 250 H.P. motor requires floor space only 3 feet square.

SIMPLIFIED PIPING: No suction piping required.

NO PRIMING PROBLEMS: Pumping element always submerged.

FLEXIBILITY OF DESIGN: Vertical multi-stage construction permits selection of correct number of stages for head and maximum efficiency.

LOW MAINTENANCE COST: Heavy duty, *vertical* construction eliminates side thrust. Centered discharge column permits accurate alignment.

All the facts on Deming Vertical Turbine Pumps are necessary to judge their advantages. Write:

THE DEMING COMPANY • 556 Broadway, Salem, Ohio

CALL YOUR DEMING DISTRIBUTOR for help on pumps!

Gerber's HTST Unit

—*Continued from page 71*

upon product flow, from the recirculation system, is first carried across an inspection plate and thence goes into the formulation tank. Inspection is made to assure the proper product quality and to remove any possible foreign material.

This cold formula material is then pumped by a positive rotary pump to a conventional type positive displacement, piston-type pump. The latter provides a flow of material at uniform pressures to the Calefactor.

The continuous product flow through the Calefactor eliminates many problems encountered when heating to high temperature in large batches, then holding while the entire batch is being emptied from the kettle. With continuous flow, the 40F. material is uniformly heated. And in case of line breakdown, there is no need to dump a part or all of a batch because of deterioration.

The positive rotary pump that discharges product from the Calefactor is set to deliver a slightly higher product volume than the Calefactor feed pump. This procedure eliminates the need for complex float or level controls which would otherwise be necessary to assure flow through the Calefactor to prevent accumulation of product in this unit. This permits the utilization of the entire inner surface of the unit for the flow of product film.

The closely coupled positive rotary discharge pump moves the sterilized material into the holding-coil. This coil is so constructed that any length of flow may be arranged, depending on the holding time required for a product. This makes it possible to hold products when it is desirable to obtain a "cooked" flavor, as well as for thermal process requirements.

A back pressure of about 5 psig. above the controlled pressure in the Calefactor is maintained in the holding coil to insure a uniform flow of deaerated product and to eliminate the possibility of it flashing in the coil.

Employed here is back-pressure control valve, located at the inlet of the vacuum pan. Of unique design, it is air-controlled and so constructed that the air pressure applied to its piston represents the identical pressure of the product in the holding coil.

When opened, the product then flashes into the vacuum pan, where it is flash-cooled to desired filling temperatures.

Product is removed from the vac pan by a Moyno pump which, for

this purpose, was reversed so that its discharge port becomes its intake.

This eliminates the discharge port packing gland seal, which was susceptible to wear, resulting in air leakage into the vac pan.

The rotor and stator of the pump now form the discharge of the pan and are always in contact with product flow. Stator is sealed to pan with an "O" ring seal. And in addition to eliminating air leakage, this also abolishes the possibility of vapor locking, even under extremely high vacuum.

End (Resume reading on page 72)

Grading at 40 Per Sec.

—Continued from page 67

type relay corresponding to the color category indicated.

Each of the 60 delivery stations is equipped with three such relays, which are connected electrically with the previously mentioned latch solenoids on the gates.

A fourth relay is unnecessary, since all lemons remaining in cradles that have passed the first three delivery alleys are automatically released as they approach the yellow alley.

All surfaces in the alleys with which the fruit comes in contact are carefully padded with rubber baffling, which decelerates and cushions the fall of the lemons.

Automatic filling machines are located at the end of the delivery alleys. Empty storage boxes travel around these machines on a "merry-go-'round", and are automatically diverted to the machines as needed.

Filling is accomplished in four steps: The first, occurring while the bottom of the storage box is held almost against the lower edges of the chutes, deposits the bottom layers of fruit. Then when approximately 12 lb. have been packed, the loading platform automatically lowers the box to the second filling level, where another 12 lb. are deposited.

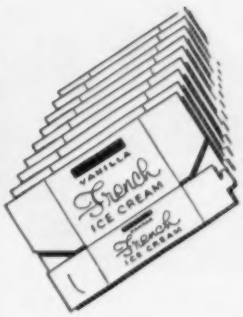
This continues until the box has received approximately 50 lb. of lemons. It then moves away on a roller conveyor, making room for the next box.

Systems of light beams and electronic eyes, situated at locations where conveyors converge, prevent boxes from colliding, piling up.

Gates, actuated by the broken light beams, rise in the path of oncoming boxes, allowing those having the "right-of-way" to pass first. When these have safely moved along, the gates lower and the detained boxes are allowed to continue.

End (Resume reading on page 68)

This new Imprinter saved $75,000 in cartons for ice cream company!



An ice cream manufacturer had a large stock of unusable cartons, printed with names of flavors no longer made . . . Run through a Pitney-Bowes Package Imprinter, the old flavors were blocked out, new flavors printed. Saving—$75,000! And with the Imprinter, his regular carton inventory is now reduced by $15,000!

This amazing new machine cuts printing costs, reduces carton inventory, prints only as needed for current production, has innumerable uses—saves time and costs in any packaging operation.

The PB Package Imprinter gives a quality impression, with close register, on coated or uncoated paper, board, foil, plastic—at speeds up to 7,500 an hour. Adjustable without tools, it can be run by anybody. Flexographic ink doesn't have to be mixed, dries instantly. Prints from rubber mat or metal type, on a printing area up to 4" by 18". Handles sizes up to 18" by 18", in thicknesses from .010" to 3/16".

This versatile money-saver also imprints labels, advertising material, dealer literature, etc. Call any PB office for demonstration. Or write for free illustrated folder and case studies.

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...doing a sweet job for Maui pineapples

At the Maui Pineapple Company sugar ionization plant in Hawaii, they had a big problem in piping to lick before they upped their output to 60 or more gallons of purified syrup per hour.

First, they needed piping that would not be attacked by chemicals. Next, the piping must not contaminate, discolor or impart any kind of a taste to the pineapple juice.

Uscolite plastic pipe, fittings and valves were installed throughout the plant, and proved to be exactly what Maui Pineapple Co. wanted. Uscolite resists chemicals, has no effect on food or food processing materials. And in the warm humid climate of Hawaii, cold Uscolite pipe lines have far less tendency to sweat than metal pipe.

Uscolite has been adopted by over 500 leading chemical processors. For replacement or completely new piping, contact any of the 28 "U. S." District Sales offices or write us at Rockefeller Center, New York 20, N. Y. You are assured of immediate delivery of standard sizes and threaded fittings, including Uscolite (Hills-McCanna) valves.

US RUBBER

Mechanical Goods Division

United States Rubber

Questions & Answers

THIS MONTH'S PROBLEM

Part-Time Compressor

Question—We are considering making a concentrated dairy product which will have to be cooled after concentration. To do a quick and efficient cooling job, it will be necessary to use both sweet and well waters.

The difficulty is that this will be a batch process. Coming from the concentrating pan, a batch will require considerable refrigeration for a short time. For the rest of the time, however, the refrigeration compressor will not be needed. We are reluctant to invest in such equipment in view of the low use factor. Could you suggest some alternate method of overcoming this drawback?

APRIL PROBLEM

Losing Refrigeration

Question—Recently, we decided to go into the frozen-food field, and installed a small freezer with an ammonia-refrigeration system. At first, it seemed to work all right. Lately, however, we have noticed a slight loss in capacity and an increase in cooling-water usage. We don't know of any changes in our equipment or operation that would account for this. Could you suggest the possible cause and cure?

Answer—The two things you note suggest that possibly air or other non-condensable gases have accumulated in the refrigeration system. While theoretically this should not occur, it is quite common in practice—especially if the system has recently been opened for repairs.

Presence of non-condensable gases not only gives rise to these symptoms, but causes an increase in power costs (2% for every 4 lb. excess head pressure, according to some claims). There is also increased wear and tear on the compressor that eventually shows up in higher maintenance costs.

Quickest way to determine whether this is your problem is to check head pressure and liquid temperature against values in standard tables. If non-condensables are present, condenser pressure may build up from 10-40 lb. above normal. For example, with an ammonia temperature of 70F., normal pressure should be 114.1 psi., but air might bring it up to 124-154 psi.

The correction, of course, is to vent the non-condensables from the system. This may be done manually but with great care. In all probability you will encounter trouble with ammonia fumes.

A better solution is to install an inexpensive automatic purging device. It collects the non-condensables in a refrigerated trap and vents them through an automatic valve. Thus, there is virtually no loss of refrigerant, and the system operates efficiently.

More on April Problem

There are a number of possible causes of decreased tonnage, which is accompanied by increased cooling-water consumption. The most likely is that the unit is newly installed. Probably the new condenser tubes have formed scale, thus reducing efficiency of heat exchange and changing condensing temperature. First, check the flow rate against the temperature rise of cooling water across the condenser.

Should this be the source of trouble, set up a maintenance schedule for cleaning condenser tubes. Also, check cooling-tower operation to see that blow down is sufficient to compensate for water hardness.—*Edward S. Olney, Bryn Mawr, Pa.*

Making Fried Bacon Rinds

Question—Can you send whatever information you have on manufacture of fried bacon rinds—cocktail snacks that are packed in transparent bags?

Answer—Select smoked bacon rinds that are free of blemishes and hair

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Insure Uniform Quality Cooking

DOUBLE-CHECK with COOK-CHEX

The Easy-To-Use Cooking Indicator Tag

When a Cook-Chex is attached to a retort basket . . . *Anyone* in your plant can double check, at a glance, *two important* facts!

1. **The basket has, or has not, been through the cooking process.**
2. **It has, or has not, been subjected to *proper* cooking conditions.**

These two facts are important to you because they eliminate the usual problems of: a wrong cook schedule, keeping baskets in sequence, and the possibility of "losing" uncooked baskets!

Easy-to-use Cook-Chex signal these essential facts automatically! Cook-Chex, produced with a *purple* chemical ink, turn color to *green* only after your proper cooking conditions have been achieved. Cook-Chex react to precise conditions of temperature, steam and time; and, may be ordered to meet your specific cooking requirements.

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Regardless of your layout or what ice cream products you produce, wire mesh belts can minimize manual handling and speed production. As shown above, both top and bottom of one belt are used to carry bulk and confections in and out of the hardening room. On the frozen stick line, one belt picks up empty molds and carries them under filling spouts and stick inserters directly to the brine tank. Open mesh permits free circulation of cold air and does not trap drippings, fruits or cake crumbs. All-metal belts are easily cleaned and permit easy sliding of trays and molds without damage to belt, trays or packages. Write for detailed discussion of how Cambridge Wire Mesh Conveyor Belts can increase efficiency and help maintain sanitary requirements.

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. . . meat, poultry, candy, fruit or produce . . . canning, freezing, baking . . . Cambridge Wire Mesh Conveyor Belts can reduce your operating cost and increase product quality by continuous uniform processing with reduced manual handling. Lifelong rust protection, quick drainage of process solutions, lack of odor and freedom from contamination are only a few advantages. All-metal belt is impervious to damage from heat and cold. There are no sharp edges because Cambridge belts are woven of round wire.

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Call in your Cambridge FIELD ENGINEER to discuss how you can cut food processing costs by continuous operation. Look under "BELTING, Mechanical" in your classified phone book. OR, write for FREE 130-PAGE REFERENCE MANUAL illustrating and describing wire mesh conveyor belts. Gives mesh specifications, design information and metallurgical data. Ask for Special Industry Folder on your operation.

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roots, and those with a good light color. In Federally inspected plants, rinds must meet standards for edible products.

Using a band saw, cut the skins into strips of about ¾x1x2½ in. Place them into a wire-mesh basket and immerse in an open-fire kettle containing 160-F. lard. Gradually increase lard temperature to 275 F., and hold at this temperature for 2¾ hr. Remove filled baskets from kettle and drain the bacon rind strips.

Now transfer baskets of strips into a second kettle for flash-cooking in 400-F. lard so as to induce puffing. Drain rind strips, spread on packing table for sorting and packaging. Reject charred rinds or hard ones (not puffed).

More on Turkey "Log"

Turkey log (also known as turkey loaf) usually is the raw, frozen skin and meat of turkey, either molded in cylindrical or rectangular shape or tied in a roll. It is generally of 4 to 5 in. dia. (or 4 to 5 in. width and depth) and from 10 to 15 in. long.

Amount of skin varies from 8 to 14% of total weight of the log. White and dark meat should be added in the ratio in which they occur in whole turkey. For high acceptability, there should be at least 55% white meat and not more than 45% dark.

Turkeys should be dressed (all feathers, pinfeathers, and blemishes removed) and chilled to about 40F. Skin is used to wrap the log, thus it should be removed in as large a piece or pieces as possible. With good technique, this can be done in 1 or 2 pieces. Meat is then removed, also in pieces as large as possible.

Only edible meat should be used. Meat from the neck, tail, fat, giblets, and other organs and glands are usually excluded, although one patent calls for making an emulsion from the heart and gizzard and spreading it between the meat layers.

In forming the log, the skin is laid inside the mold or, for the tied roll, it is laid on any work surface. Then meat is added, either as one layer of white meat and one of dark, or as two layers of white meat with one of dark between. Meat may be seasoned with salt, pepper, and monosodium glutamate. Take care to avoid overseasoning and to assure uniform distribution.

The skin (with a second piece if the first one is not large enough) is wrapped completely around the meat. The top mold is applied and pressure may be used to make the mass more compact. The log is frozen

and then unmolded. It may be wrapped in aluminum foil or other protective material. In forming the tied roll, it is held together with cotton twine at 2 to 3 in. intervals (similar to a rolled roast). No mold is used here.

Several patents cover these features —Nos. 2,182,891; 2,267,442; 2,364,049; 2,571,544; and 2,640,779.—*Alan W. Katzenstein, Food Technologist, New York City.*

Choosing Cooking Kettles

Question—We make macaroni and spaghetti, but are also considering entering the spaghetti-sauce field. We are getting a small steam-jacketed kettle for experimental sauce preparation. Since we have had no experience with cooking kettles, we would appreciate any advice you can give on the proper way to hook up such a kettle for best results.

Answer—It would be advisable to do enough preliminary work with sauce recipes to determine whether the flavor would be affected by the metal used for the kettle, and the speed of cooking. For example, copper will give you rapid cooking, but in contact with certain food ingredients it may cause undesirable flavor changes. On the other hand, stainless steel is very unlikely to impart any off flavors, but its heat transfer rate is somewhat lower. Consequently, cooking a given-size batch may take longer. Nickel or aluminum kettles give quicker cooking.

After selecting the kettle material, decide on the amount of jacketing. Many kettles are made with but one-half or two-thirds of their surfaces steam-jacketed. These minimize any "burn-on" or scorching. We also suggest a "flush-type valve" for product discharge. This seals off the kettle at the opening, avoiding pocketing of uncooked product in the outlet pipe.

For steam pipe and condensate return-line sizes, use the kettle manufacturer's recommendations. Both pipes must be of adequate size for proper

---

Q.—Can you furnish me with a formula for a meat loaf dip coating that resembles sheets of back-fat?

A.—Add 60 lb. of 200-F. water into a chopper along with 15 lb. of gelatin. Then introduce 30 lb. of lard, 20 lb. of nonfat milk solids, and 3 lb. of salt. Chop-mix until batch reaches dipping temperature (100 F.).—*Formula from American Dry Milk Institute, Inc., Chicago.*

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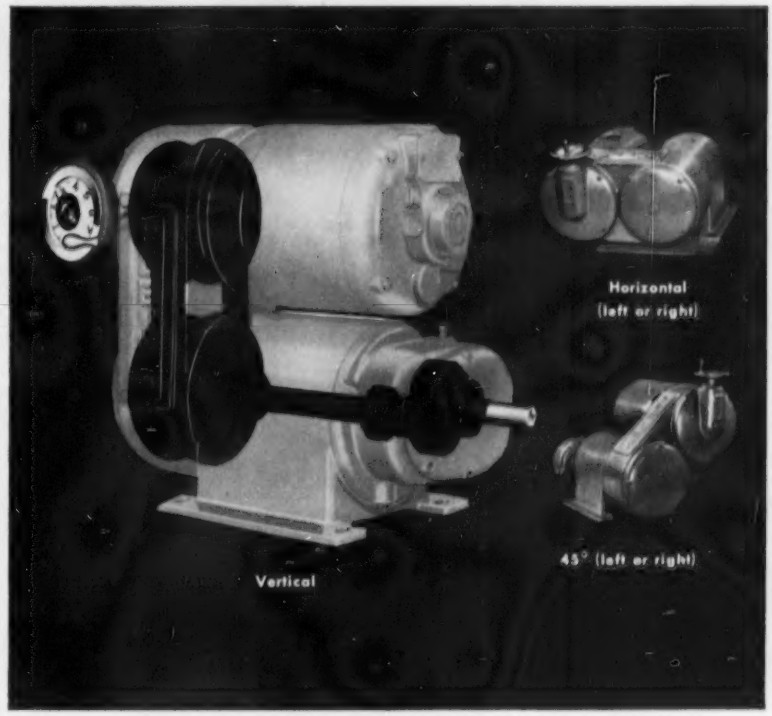

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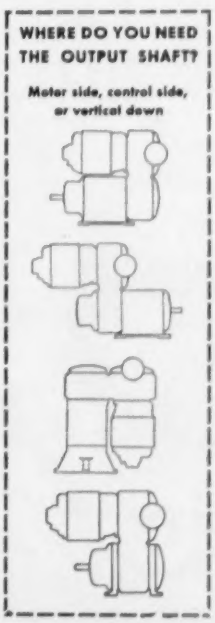

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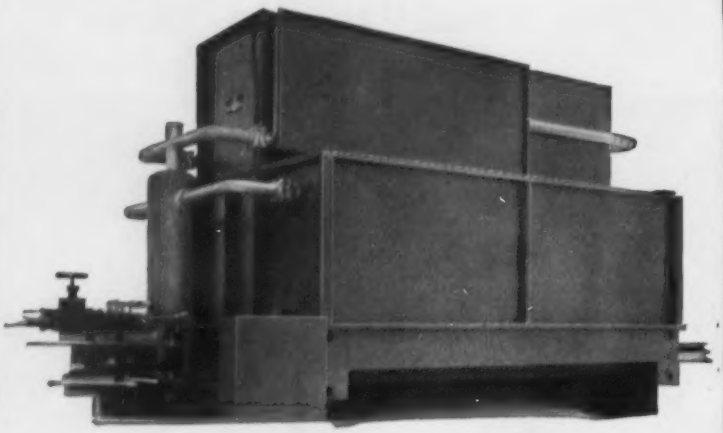

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kettle performance, but he can specify sizes of the kettle connections.

Experiments have proved that, in general, a steam-jacketed kettle will do a better all-round job if it has a suitable trap than if condensate is controlled simply by a cracked valve. In other words, cooking time is shorter and steam consumption is less, because the trap discharges condensate at the proper rate and also removes air.

The trap should be installed close to, and below, the kettle. It is poor practice to connect more than one kettle to the same trap. So if you contemplate adding more kettles after your experiments, keep this fact in mind. Otherwise, you may have trouble with steam short-circuiting, and you will not get full and uniform performance from all kettles.

Selection of the correct size and type of trap is important, but must be worked out with the trap supplier. Reason is that traps vary not only with size of the kettle but with steam pressure and how rapidly the product must be cooked.

One final point, since you have had no previous experience with steam-jacketed kettles, is that safety precautions must be observed. As a pressure vessel, it is equipped with a safety pop-off valve. This should be arranged so when it opens, the operator cannot be scalded. The kettle should be protected from blows or scraping which might weaken it, should be frequently inspected, and should be given a hydrostatic pressure-test periodically at a pressure well above that at which it operates.

Powdered French Salad

Question—Can you suggest a formula for making French salad in powdered form, to which a chef need add only liquids?

Answer—You might consider two basic formulas that could be modified to suit your requirements:

Dry French Salad No. 1.—Coarse salt, 50.00 lb.; soluble celery (sugar base), 14.00 lb.; sucrose, 12.50 lb.; paprika (high color and fine grind), 9.75 lb.; red pepper (fine grind), 5.50 lb.; black pepper (fine grind), 5.50 lb.; and monosodium glutamate, 2.75 lb.

To use, mix 18g. of seasoning, 65 ml. of vinegar (100 gr.), 30 ml. of water, and 145 ml. of salad oil.

Dry French Salad No. 2.—Coarse salt, 45.75 lb.; sucrose, 23.50 lb.; black pepper (fine grind), 7.50 lb.; dehydrated onion powder, 6.00 lb.; monosodium glutamate, 6.00 lb.; soluble celery (sugar base), 3.00 lb.;

it sets a man to thinking!

"Flavor Improvement, New Products, Product Development—what I would have given for that kind of help when I started this business.

"Come to think of it an outside evaluation of flavor might be a smart move for us. Then if our product has become a little old fashioned, we will find it out before decreasing sales tell us.

"Guess we should check with them on Product Development, Eye-Appeal, New Product Suggestions, too. We've known the Stange name for years so—like they suggest—perhaps we'd...better check with Stange and be sure."

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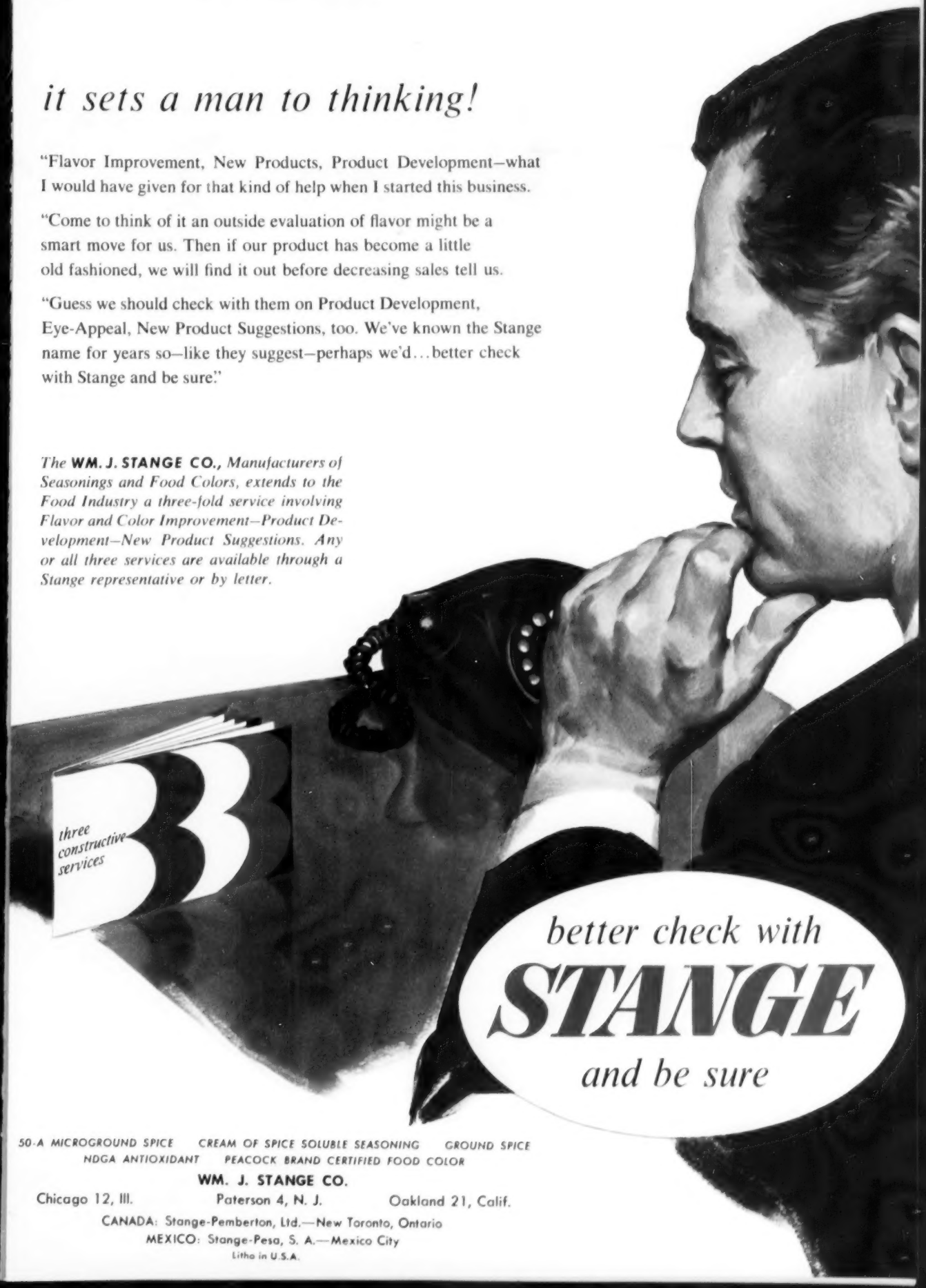

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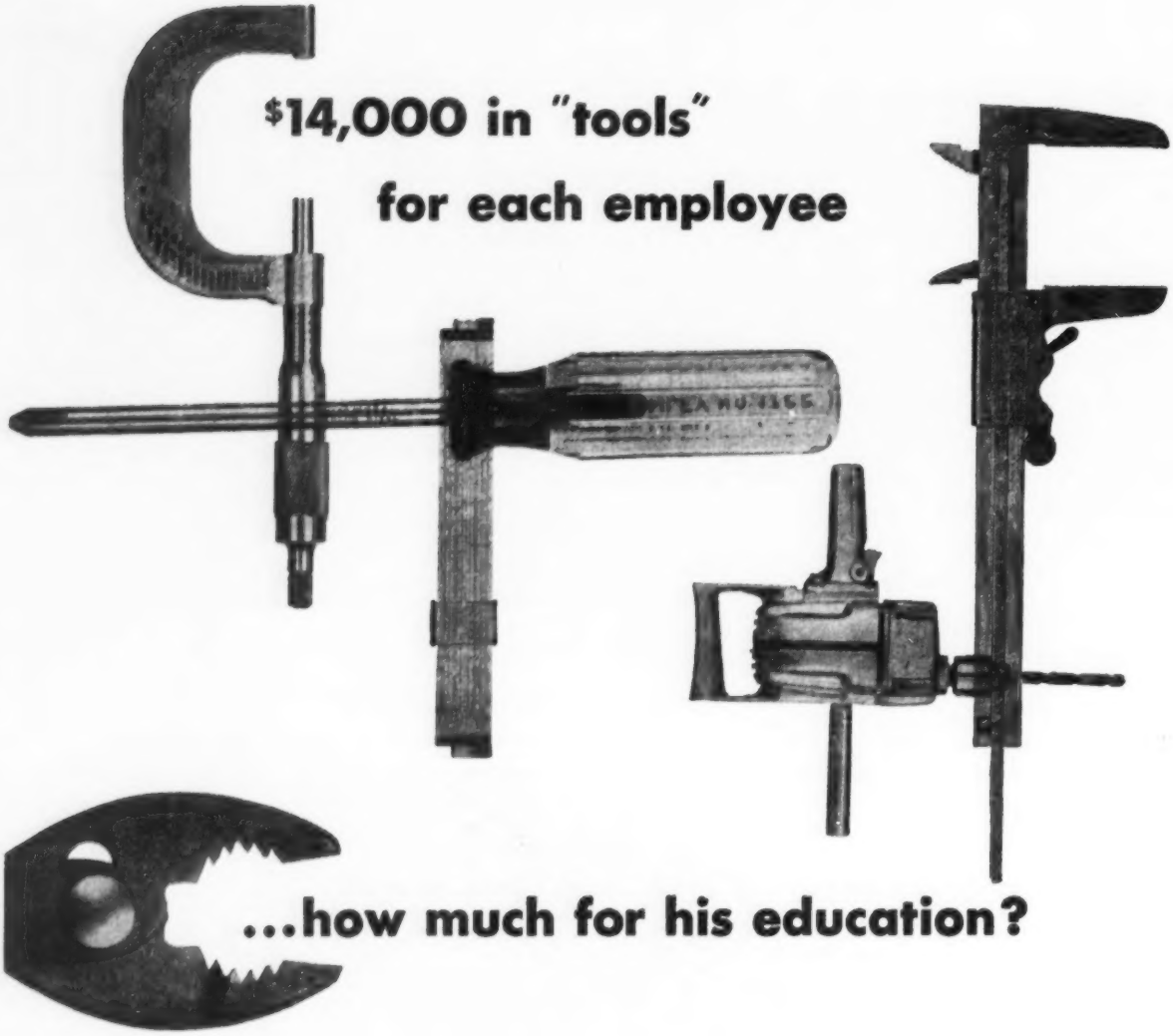

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dehydrated celery stalk, 3.00 lb.; mustard flour, 3.00 lb.; red pepper (fine grind and high heat), 1.00 lb.; and tumeric (fine grind), 0.75 lb.

Mix 17g. of seasoning with 65 ml. of vinegar (100 gr.), 30 ml. of water, and 145 ml. of salad oil.—*Roy E. Morse, Professor of Food Technology, Rutgers University, New Brunswick, N. J.*

Apple Tart Formula

Question—Can you offer a formula for making small apple pies that are to be frozen in unbaked form?

Answer—Perhaps this apple tart formula may serve your purpose:

Introduce into steam kettle and bring to full boil: Water, 3 lb.; sugar, 1¾ lb.; salt, 1 oz.; nutmeg, ⅛ oz.; cinnamon, ¼ oz.; and canned diced apples, 7 lb.

Then mix well, add to batch, and cook clear 1 lb. of water and 7 oz. of starch (preferably waxy maize if pie is to be frozen).

Add, and mix in well, 8 oz. of corn syrup, ½ oz. of butter, and ¼ oz. of fresh lemon juice.

Scale 2½ oz. of filling into 4-in. pie with 1-oz. bottom and 1-oz. top crusts.—*Formula by the C. H. Musselman Co., Biglerville, Pa.*

Hints on Curbing Flies

Question—Big problem in our cannery is to keep out flies. They breed on food wastes outside of the plant and soon find their way into the factory. Can you recommend a good, systematic method of keeping them out of our cannery?

Answer—Step-by-step, here's what we recommend:

1. Eliminate all damp, nutritive fly-breeding areas around your cannery. In your case, emphasize adequate means of disposing of cannery wastes and preventing spillage.

2. Adopt a fly-baiting program in out-of-the-plant areas. Flies killed on the outside cause no trouble inside. Most popular is the use of insecticide, malathion (an organic phosphate-type liquid spray). It contains 1 to 2% malathion and fly attractants like lactose, molasses, and whey solids. When sprayed on outside plant walls, it attracts flies which walk across them, pick up the residual insecticide, and die.

Equally effective, as a supplementary bait treatment, is the use of scattered, dry-type fly baits—hominy grits, oyster shells, etc. impregnated with 1-2% malathion.

3. Set up fly barriers to keep the

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The Geo. Wiedemann Brewing Co., of Newport, Kentucky had an algae problem on the water-side surfaces of their pasteurizers that increased operational costs, cut pasteurization efficiency, caused corrosive pitting of the units, and created very objectionable odors.

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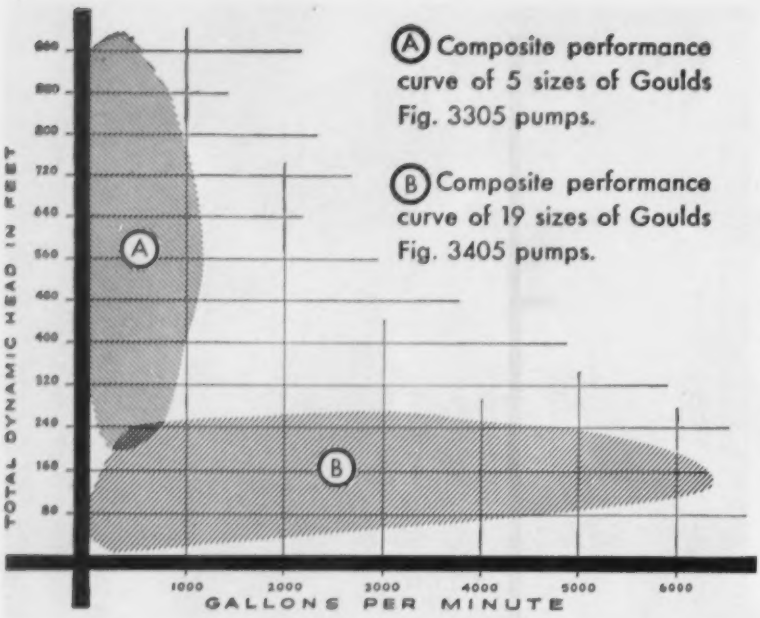

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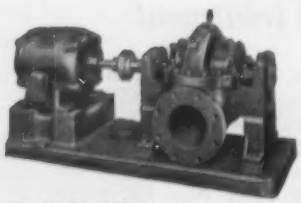
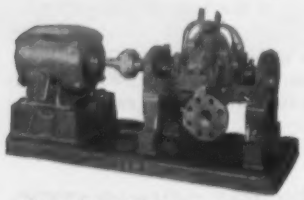


Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

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few remaining flies from getting into the cannery. This involves the use of adequate screening, self-closing devices on doors, invisible air curtains over entrance areas, and reduction of doorways to a minimum.

4. Space spray confined entrance areas periodically to set up another barrier against flies.

5. Apply residual insecticides to walls and ceilings non-processing areas. Suggested is the use of an oil-soluble residual insecticide containing ½% Lindane and 3% Methoxychlor.

6. Look into the possibility of adopting a new away-from-process area fly-killing technique that involves use of parathion (1% of this insecticide) impregnated in suspended strings. Object here is that flies "roost" on suspended light cords during the night, and insecticide-impregnated strings would provide another means of destroying them.

7. Space spray processing areas only at termination of production. Inasmuch as flies have been becoming more and more resistant to chlorohydrocarbon insecticides like DDT, Chlorodane, and Lindane, there's now a trend toward adopting pythrins in combination with synergists, to which they don't develop an immunity.

Space-spray insecticides of this type for inside fogging would contain pythrins, allethin, or both, together with a synergist like Octicide 264 or pipernoyl butoxide.—*T. L. Hugé, American Sanitation Institute, (Div. of The Hugé Co., Inc.), St. Louis, Mo.*

Seasonings for Spaghetti

Question—We are extremely interested in manufacturing a dry spaghetti sauce seasoning. Do you have formulas that require the addition only of liquid component?

Answer—Try these two formulas:

Formula No. 1.—Salt, 29.50 lb.; starch (cold water), 28.50 lb.; sucrose, 14.50 lb.; dehydrated onion powder, 7.50 lb.; dehydrated garlic powder, 7.50 lb.; basil (fine grind), 6.00 lb.; baking soda, 4.75 lb.; black pepper (fine grind), 0.75 lb.; oregano (fine grind), 0.50 lb.; and fennel (fine grind), 0.50 lb.

Mix 13.75g of seasoning with one 6-oz. can of tomato paste, two 6-oz. cans of water, and 1 tablespoon of salad oil. Simmer 15 min., and use 8 oz. of spaghetti (before cooking).

Formula No. 2.—Salt, 30.00 lb.; sucrose, 24.00 lb.; dehydrated onion chips, 13.00 lb.; potato flour, 11.50 lb.; non-fat milk solids, 5.00 lb.; black pepper (fine grind), 2.00 lb.; dehydrated celery stalks, 1.50 lb.; dehydrated garlic powder, 1.50 lb.; soluble

bay (sugar base), 1.50 lb.; dehydrated carrots, 1.25 lb.; soluble allspice (sugar base), 1.25 lb.; oregano (fine grind), 1.00 lb.; and soluble clove (sugar base), 0.50 lb.

Simmer for 15 min.—20g of seasoning, one 6-oz. can of tomato paste, two 6-oz. cans of water, and 1 tablespoon of salad oil. Use 8 oz. of spaghetti (before cooking).—*Roy E. Morse, Professor of Food Technology, Rutgers University, New Brunswick, N. J.*

Ham Falls Apart

Question—Upon slicing, some of our boneless, cooked ham loaves break into pieces. We attribute this to air pockets formed between raw pieces of ham when joined to make a loaf. What do you think, and what is the solution?

Answer—First, we'll assume that your slicing knives are not dull. Then, poor slicing of hams may be brought about by any of these conditions:

1. Keeping the ham too long in a warm room. Natural gelatin in ham loses its binding properties due, for example, to liquefaction by bacteria.
2. Forming hams with insufficient pressure. Pieces do not adhere in a solid loaf.
3. Loading ham pieces into metal forms so that cut surfaces are not pressed together.
4. Using over-cured or roughly handled hams.
5. Overcooking or holding hams too long in cooker.

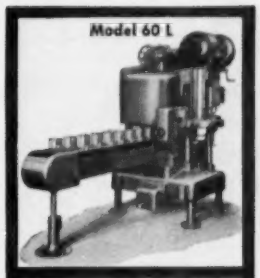
Aspic-Type Chicken Salad

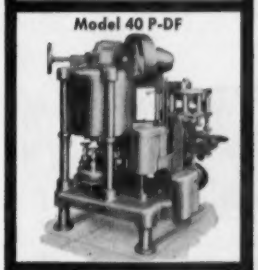
Question—I'd like details of preparing and putting up a quality aspic-type chicken salad in 16-oz. polystyrene containers with polyethylene snap-on closures?

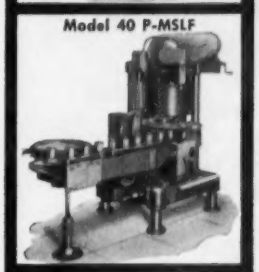
Answer—Soak 13½ oz. of gelatin 5 min. in 1¼ qt. of chicken stock (highly seasoned with onion, celery, salt, and pepper). Heat in jacketed kettle 5¾ qt. of seasoned chicken stock, add 1 gal. of water, and introduce gelatin-chicken stock blend into the mix.

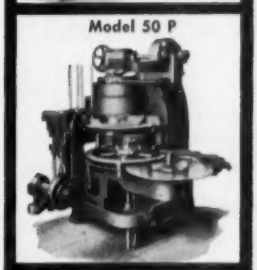
After gelatin dissolves, turn off steam and add 1¼ pt. of lemon juice, 1¾ oz. of salt, and ⅞ oz. of ground pepper. Mix thoroughly and cool. When batch starts to stiffen, fold in 10 lb. of cooked, shredded chicken; 3 lb. of diced, uncooked celery; and 2½ lb. of shredded pimiento.

Fill into 16-oz. polystyrene containers and seal with "poly" lids.









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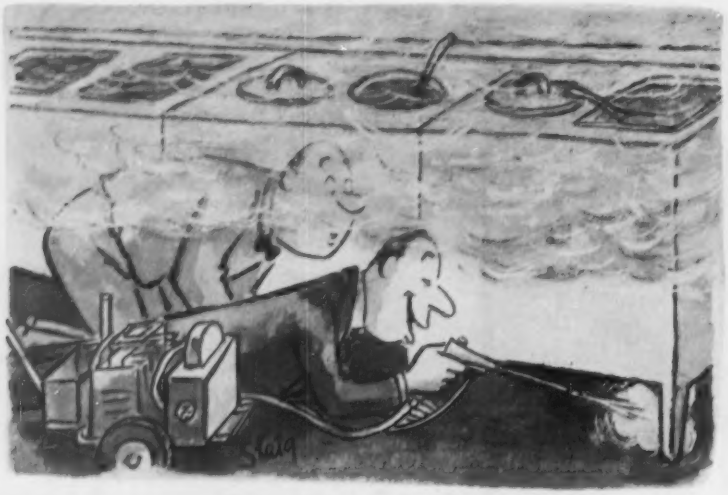

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Canned Baked Beans

Question—What information can you furnish for preparing baked beans to be packed in cans?

Answer—Wash 63 lb. of dry California pea beans, and then soak overnight. Parboil soaked beans 50 to 60 min. Charge a little less than half of the parboiled beans into a pressure cooker along with 1½ lb. of salt, 3 lb. of white pepper, 1½ oz. of mustard, 6 lb. of brown sugar (dark), and 12 lb. of brown sugar (light).

Now introduce the rest of the beans together with 12 lb. of pork (fancy brisket fat) and 81 lb. of hot water. Run pressure in cooker up to 20 lb. and hold at that pressure for about 20 min. Fill into cans, seal, and heat-process.

Loses Salt From Nuts

Question—How can we make salt adhere to salted peanuts? We lose a large amount of salt during our bagging and canning operations. Further, even more salt is lost between the time packages leave our factory and are consumed.

Answer—First, be sure to use a medium grained salt. A coarse salt won't adhere well to peanuts, and fine one forms white spots after the nuts cool.

Second, use a high-melting point (92-110 F.) coconut fat to bind the medium grained salt to the surface of the nuts. Do it by cooling the nuts after taking them out of the oil-cooking vat. Then spray the cooled nuts with melted coconut oil, cool, and add 2% salt.

Freezes Ham Unwrapped

Question—Have you ever heard of a method of freezing fresh cuts like hams and bacon bellies without wrapping them with moisture-vapor-proof paper?

Answer—We understand that some packers have omitted wrapping of frozen meats to build up their frozen inventories and level off seasonal peaks and valleys in livestock marketing.

Instead, a simple glazing (ice-coating) process is employed. Unwrapped fresh meats generally are placed on racks and quick frozen at below-zero temperatures. They are then immersed in a tank of cold water so that a glaze of ice completely covers them. Some packers simply stack frozen meats in bins and turn a hose on them.

Periodically, the ice-glazed meats are sprayed with water to make up for dehydration of the ice.

Fish Stick Makers

—Continued on page 90

It is recognized that these measurements do not indicate actual viscosity; since mixtures of water, flour, egg solids, milk solids, and other ingredients, do not have Newtonian characteristics.

Weight loss of fish sticks during frying (Fig. 3) appears to be related to overall batter pickup, in this case too, by a logarithmic relationship. A 28% increase in batter pickup (based on weight of the uncooked stick) results in a tenfold decrease in loss of weight during frying.

Reflectance values at various wavelengths indicate that rate of color development is most rapid when rice flour alone is the flour ingredient. Rice-wheat, corn alone, and rice-corn flour mixtures also brown at fairly rapid rates.

In further investigations of the relationship between liquid batter viscosity and overall pickup, viscosity alone was varied in a series of corn flour-water suspensions through use of 0 to 0.5% guar gum.

Difference in overall pickup, as measured by ten sub-samples for each level of gum used, were all significant at the 1% level. A plot of the log of viscosity against overall batter pickup again demonstrates the logarithmic relationship.

References and Bibliography

1. Butler, C., "Voluntary Federal Grade Standards for Sticks," *Quick Frozen Foods*, 17 (6), 70-72, 1955.
2. Holston, J., "Some Factors Affecting the Color of Fish Sticks," *Com. Fisheries Rev.*, 17 (1), 11-13, 1955.
3. Umpleby, J., Pincus, B., and Block, Z., "Tests Determine Range of Breader Pickup," *Quick Frozen Foods*, 17 (6), 63, 68-69, 1955.
4. Assn. of Official Agricultural Chemists, *Official Methods of Analysis*, 7th ed., 1950.
5. Paterson, D. D., *Statistical Technique in Agricultural Research*, McGraw-Hill Book Co., New York City, 1939.

Pomeranz, R. S., *Objective Food Color Evaluation by Rapid Spectrophotometric Technique*, S. M. Thesis, Dept. of Food Technology, MIT, 1953.

Anon., "Frozen Foods Spell New Profit for Breading Suppliers," *Quick Frozen Foods*, 16 (5), 47-64, 1954.

Lirot, S. J., *A Study of Some Factors Affecting the Quality of Precooked Frozen Fish Sticks*, S.B. and S.M. Thesis, Dept. of Food Technology, MIT, 1955.

This article is based on the paper, "A Study of Some Factors Affecting the Quality of Frozen Precooked Fish Sticks." Authorized as Contribution No. 287 of Department of Food Technology, Massachusetts Institute of Technology, Cambridge, it was taken in part from a thesis with the same title, submitted by S. J. Lirot to MIT in partial fulfillment of requirements for the S.B.-S.M. degree, 1955.

End (Resume reading on page 93)

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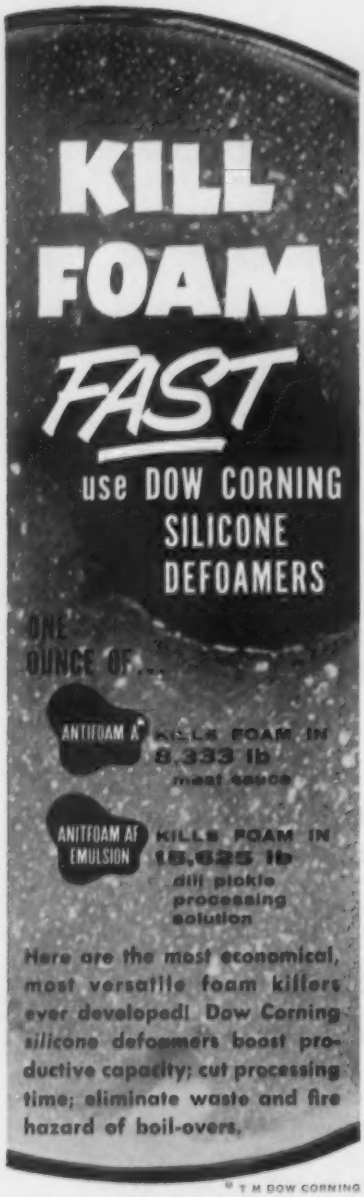

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This second edition of a standard reference work has been completely revised by Sydney Prerau, director of the J. K. Lasser Tax Institute.

Since the small business man may not be an expert in the field of financing, taxes, accounting, insurance, law, office management, and promotion, loopholes may exist which can affect the efficiency of operation. Book is designed as a practical guide to all of these areas of required information.

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In addition to this, a special supplement of tax ideas for businessmen is included. This serves as a handy guide in cutting the taxes levied on business profits.

Guide to Hydraulics

Standards of the Hydraulic Institute Published by Hydraulic Institute, 122 E. 42nd St., New York City 17. 1955. 9½ x 11½ in., ring bound. Price: $4.75.

Revised to include the latest developments and changes in the field, this tenth edition is a handy and authoritative reference to plant engineers. Sections on centrifugal, rotary, and reciprocating pumps are of particular interest. Book is tab-indexed for ready reference.

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6. Book of Flowsheets.....$2.00
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Manual on Fluidization

FLUIDIZATION *by Donald F. Othmer. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1956. 231 p. 6 x 9¼ in., cloth. Price:* $7.

This book presents scientific and engineering considerations of fluidization in the words of the leading engineers instrumental in developing the technique.

Based on a symposium sponsored by Polytechnic Institute of Brooklyn in cooperation with American Institute of Chemical Engineers, work contains material expanded to include critical surveys of quantitative physical and mathematical fundamentals of fluidization. Also discussed are background history, future applications, design and operation of plant with fluidization.

The book is of interest to anyone in a process where fine particles are contacted, carried, or transported.

Booklets & Reports

IFTC-NBS METHOD OF DESIGNATING COLORS AND A DICTIONARY OF COLOR NAMES (*National Bureau of Standards Circular* 553). *Published by National Bureau of Standards, Washington 25, D. C. 158 pages, paper. Price:* $2.00. Guide aids scientists, businessmen, laymen in understanding different color vocabularies.

PROPOSED NEW METHOD OF WHOLESALING FRESH MEAT BASED ON PASTEURIZATION BY GAMMA RADIATION (*TID*-8001). *Published by Atomic Energy Commission, Washington 25, D. C. 7 pages, paper. Price:* 15¢. Monograph in Industrial Atom series.

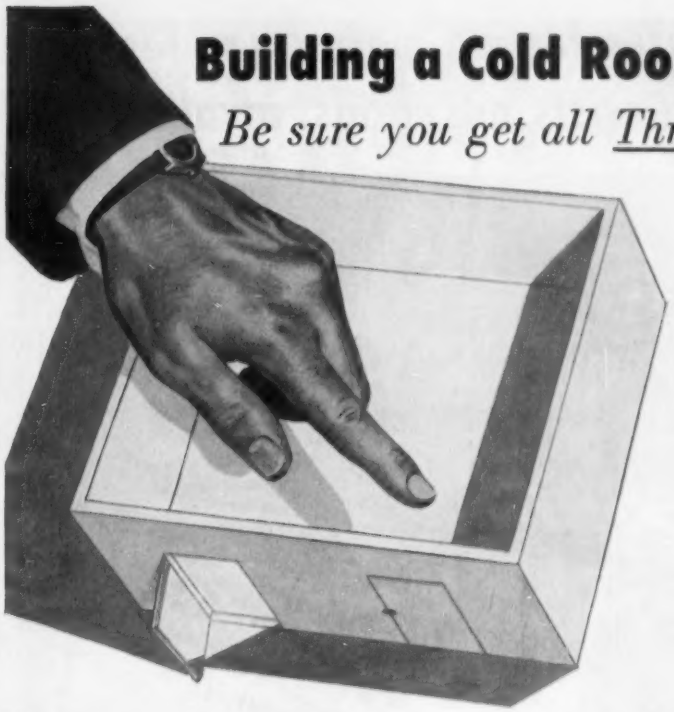
Dairy-Pack Orange Juice

—*Continued from page* 61

produced year-'round from 100% concentrate, or from various blends of concentrate and fresh juice. While there is no particular problem here about varying the formulation to meet specific crop conditions, it is obvious that formulation can vary to meet individual processor's desires or ideas.

Actually, there is no clean line of distinction between the second and third processes. The second process is practical for only a portion of the year. To build national acceptance and franchise around this item, it is important that the product be subject to year-'round distribution. To do this it is essential that the two concepts be used together.

This new dairy-pack orange juice, therefore, falls into two classes: (1)



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The snowy whiteness of Globe White Neoprene Belting exposes them all to certain detection, enabling immediate elimination with hot water or live steam. *That's sanitation-plus!*

Known as the do-all conveyor belting of the food industry, for which it was specifically developed, Globe White Neoprene Rubber Belting consists of multiple layers of hard-woven, light duck, molded together with highest grade neoprene rubber between the plies and over the entire surface . . . finished with a 3/64" thick, satin-smooth cover on the carrying side and with a friction surface on the pulley side.

The characteristics of this type of construction are unmatched: Exceptional flexibility; high tensile strength; minimum stretch . . . all extremely advantageous in operations where head and tail pulleys are small, and on machines with limited take-up facilities.

Resistant to oil, grease, acids, alkalies — possessing a satiny smoothness that makes no impression whatsoever on the product conveyed, Globe White Neoprene Rubber Belting is today on the "must" list of numerous food processing and handling concerns.

Also available in Black. Ask about Globe White Ruff Top Neoprene Incline Belting, Globe Brown Neoprene Belting, with friction surface on both sides, and Globe Brown Kling-Top Neoprene Belting, with non-slip top for incline and decline.

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Adopted by Kraft

After careful analysis of the situation, largely along the lines outlined above, our organization, Kraft Foods Co., decided to enter the field of dairy-pack orange juice on a test market basis. We felt that any nationally advertised product bearing our label should have consistently uniform quality at all times and in all places.

Faced with this quality concept, we obviously had to have a program built around the use of concentrate, with multiple reconstitution stations. These stations would be so located as to be within hours, rather than days, of the local markets. It was also felt that the product should bear a code so that our salesmen could pick up and replace merchandise which had passed what we considered to be its life expectancy.

In other words, we must first be able to manufacture a high quality product with all-year uniformity. We must then be in a position to distribute this product quickly and under regulated refrigerated conditions, and we must see to it that merchandise which did not move in a given period was removed from the market so that it did not undesirably influence the consumer's reaction to our product.

Specifications for the raw materials were carefully developed. Only the highest quality of tree-ripened fruit concentrate is permitted under these specifications. The finished product specifications were also developed with the same thought of quality uppermost in mind.

Advanced Packaging

One interesting problem encountered was the possibility of being able to effect economies by the use of types of storage and shipping containers not then customary to the industry. An extensive experimental program was then undertaken, with the result that a fiber drum and a polyethylene liner were substituted for the existing concentrate packages.

This resulted in a considerable reduction in packaging costs and to date has proved very successful.

Our company is still actively test marketing orange juice in cooperation with various subsidiaries of our National Dairy family. As yet it is too

early to determine whether this "new baby" is another frozen concentrate, or whether it will gradually die out, as did the earlier tries at dairy distribution of orange juice.

Standards Lacking

It is quite evident, however, that there is a crying need for uniformity in labeling and in product quality definition at both the federal and the state level. There is as yet no federal standard of identity for the product, nor has any faction of the field petitioned FDA for such a standard.

Thus, there is permitted wide variations in quality, and even the question of adulteration is raised. All of these factors eventually have their effect upon the consumer's acceptance or rejection of this new product.

The various state regulations are causing a multitude of questions relative to labeling, advertising, etc. While each is designed for the best interest of the consumer, it is confusing to find the package in one state bearing only a faint resemblance to that in a neighboring one.

Certainly, the greatest advance that can be made in this field is standardization of labeling and regulations so that the customer can be assured of what she is buying, and so that the manufacturer can prepare his product with assurance that it represents a legally recognized and identifiable product.

Statements made in the above article may well differ from some reader's opinion. They represent, however, Kraft's analysis of the problem and the factors that went into our decision to go down the road we finally chose.
—C. W. K.

End *(Resume reading on page 62)*

Black Light

—Continued from page 54

low to bluish-green on long exposure to air.

Following is a brief rundown of changes in other food due to staleness:

Albumen (powder): Fluoresces strong bluish. Altered if yolk powder is present.

Arabic (gum): Powder fluoresces white, phosphoresces blue-white for about 11 sec.

All-spice: Whole product appears medium brown.

Beans: Fresh seeds fluoresce bright green. Old ones don't react.

Cream: Pure cream fluoresces bright yellow, but artificial cream appears white in ordinary light, fluoresces bluish. Cream from hardened fats fluor-

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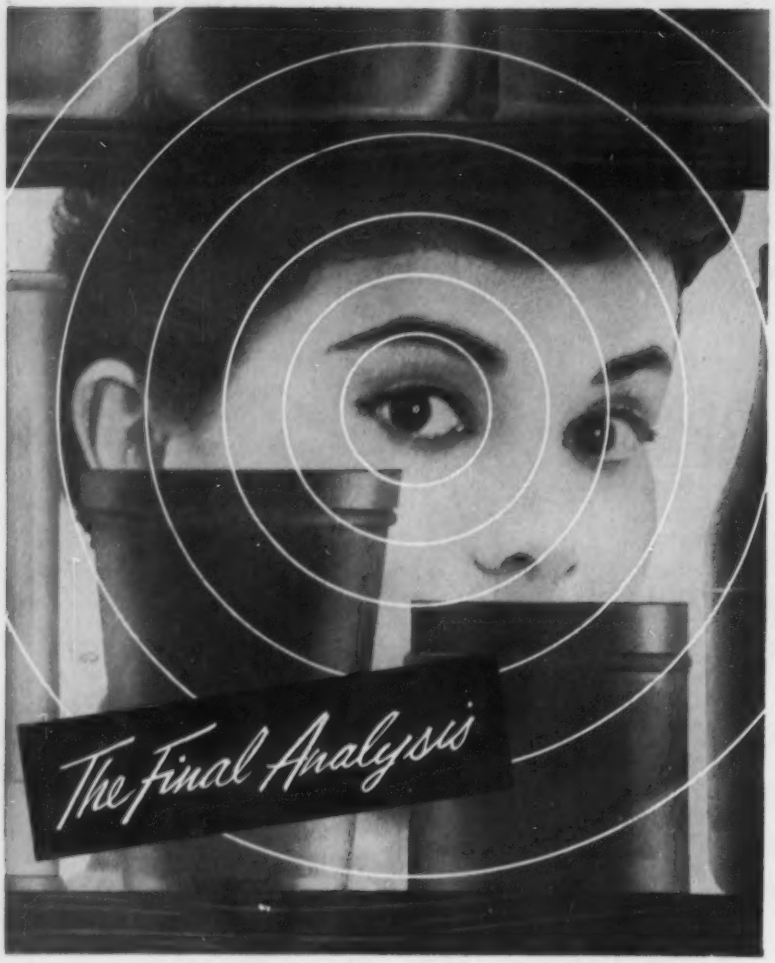

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Takamine Enzymes serve you in *two ways* — they promote smooth processing operations *and* give your product a *selling personality*.

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TAKAMINE

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esces white with a dull blue tinge tending toward violet.

Lard: Refined pig's fat, blue or violet.

Mushrooms: Edible varieties, yellow or grey; poisonous ones, brown.

Milk: Fresh milk, yellow (but if left in light for any period, as on a doorstep all day, it appears blue). Milk contamination: Cow's excreta (dried albumin), yellow to white with a bluish tinge.

Pepper, white (Singapore): Aging pepper, yellow-purple.

Pepper, black: Deep brown with age.

Poppyseed (Oriental): Aging seeds turn deep violet.

Pecan nuts: The older they become, the more deep brown in color.

Sugar: Pure sugar candies and solid sugars generally show little fluorescence, except glucose syrup, which is blue.

Other Applications

The ultra-violet lamps are also valuable in testing dishwashing machines —or, even more, manual pot-washing operations—for cleanliness.

In the case of dishwashers, about 1 part of Fluorodye* is added to every 1,000 parts of dishwasher water. Dishes are washed as usual, then rinsed under the machine's clear-water spray. Pots and pans can be hand-washed, then rinsed. Whatever the case, they're carefully scrutinized under the rays of an ultra-violet lamp in a darkened room.

Clean areas show up as dark reddish or bluish purple. Thick deposits of organic matter become highly fluorescent, since they soak up the additive. Thin layers of milk give a faint glow. On certain metals, like aluminum and other alloys, the additive may be absorbed at the spots where metal is oxidized, giving a fluorescence similar to that of organic residues.

Certain stainless steel finishes may retain enough of the additive to give a false fluorescent reaction. Galvanized iron may also absorb some of the additive. However, fluorescent areas—if they disappear when scraped—positively indicate organic material. (After test, all utensils and equipment treated with Fluorodye should be rewashed before using.)

Leaks around kettles or ingredient reservoirs can be discovered while still very small, simply by using the above mentioned additive. For tests, the reservoir is filled with water and the additive thoroughly mixed. After standing for an hour, the tank's seams and joints are inspected under black light. Variously colored fluorescent

* Ultra-Violet Products, Inc.'s name for its rinse-water detector powder.

additives—green, blue or red—may be used. Leaks are spotted instantly.

There are many other uses for black light around the food plant. It can sleuth out grease in cracks and crevices. (Greases and oils show up as shades of blue or violet.) Some plant maintenance men troubleshoot piping (process, sewage, utility) with black light. Lubricating oils tend to be a brilliant blue.

Sources of Black Light

To be used for plant inspections, the lights must be neither bulky, cumbersome, nor inefficient. The source should be small, compact, portable and, at the same time, capable of delivering a sufficient amount of black light to radiate at least 3 or 4 ft. of area. At the same time it should be strong enough to combat the influence of small amounts of extraneous visible light.

The type of filter is most important. It should be one that will absorb the maximum amount of visible radiation with the minimum attendant loss of long-wave ultra-violet.

Several units are available, each of which is specifically designed for a particular type of application.

For inspection tables, there are 40w. units that can be mounted permanently above the tables.

For plant inspections there are portable 100w. units that operate on 110v. a.c. and provide high concentrated intensity.

And for field use there are lightweight portable units that operate on either 110v. a.c. or batteries and come with special battery carrying cases.

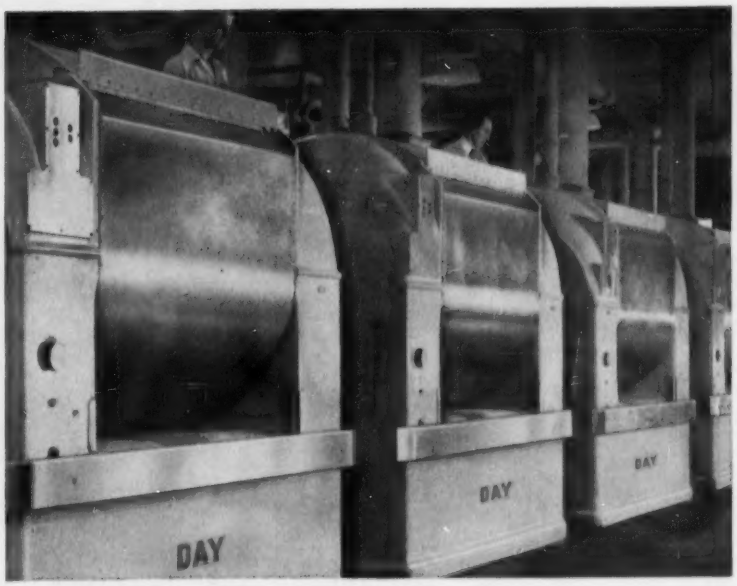
It's Good, But Not Infallible

Black light, like any tool in food science, isn't infallible. Much depends upon acquired skill and interpretation by the user. Many contaminants, for example, appear *almost* the same color under black light. The trick is to differentiate between colors, tying them definitely to their sources. As an example: Almost all greases and oils appear bluish.

What the food engineer wants to know, when he finds traces of blue fluorescence where no grease is supposed to be, is the contaminant's source. Actually, this isn't as difficult as it might appear. Careful classification of "standardized" ingredients by their fluorescing colors can, with practice, make their detection almost foolproof. But it takes time and patience.

Still, black light, properly handled, can be classed as a kind of super sleuth. And its place in the food industry is sure to grow.

End (Resume reading on page 55)



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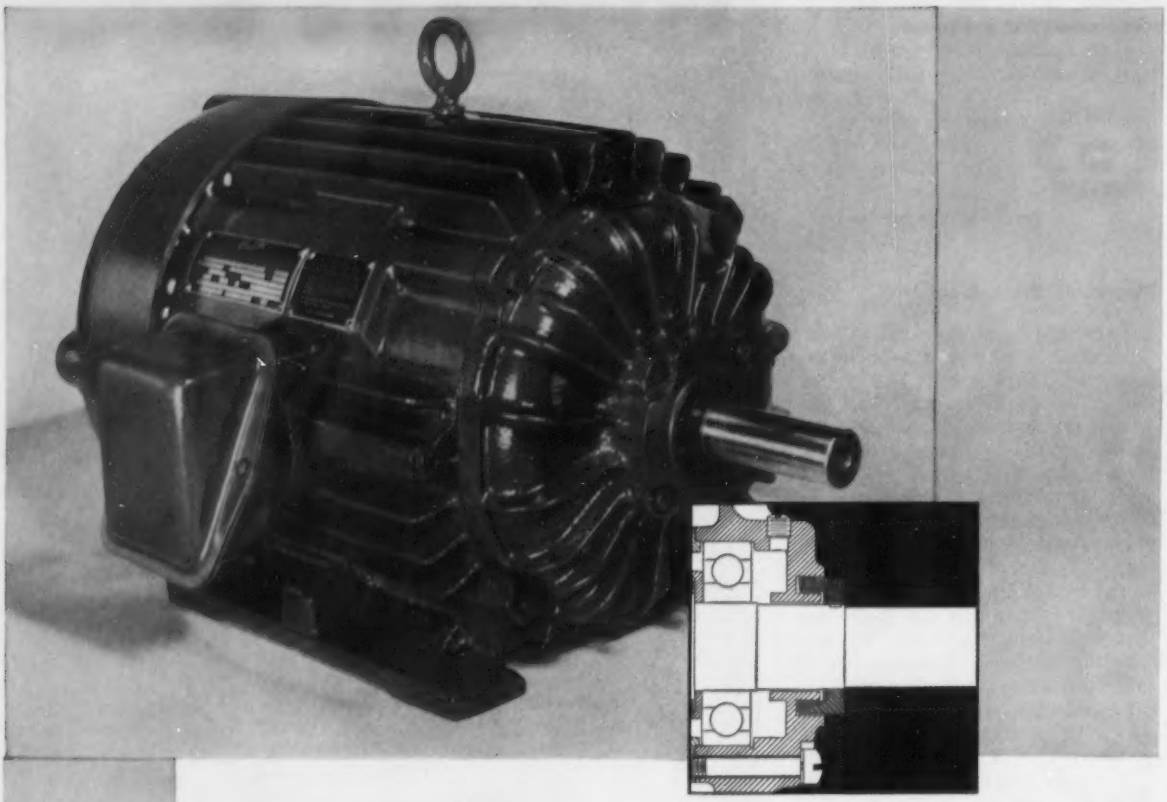

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Drug Boosts Crop Size

Super-sized fruits and vegetables, with disease-resistant qualities, have been grown by treating plants with colchicine, a gout-preventive drug, reports *Journal of Agricultural and Food Chemistry*.

However, it continues, much work remains to be done before practical commercial benefits can be derived from the process.

Yet, the drug, which works by changing chromosomes in plants, has already been applied to sugar beets, radishes, rye, watermelons, grapes, and apples.

Loretto grapes treated with colchicine are three times the size of the ordinary variety. Sugar beets yield 5-10% more sugar after treatment.

Tin Slashed in New Cans

A new process, known as margin plating, will eliminate 98% of the tin now used in beer, coffee, and pet food cans, promises Dr. Roger H. Lueck, vice-president of research and development, American Can Co.

The latest technique employs tin plate only on soldered side-seams of the cans—an area ⅛ in. wide. This insures a hermetic seal. Remainder of the can is covered with enamel to protect contents from steel plate.

Canco is already producing the new coffee and pet food cans on a limited commercial basis. Equipment for producing beer cans will be installed soon.

Acquire Citrus Plants

Purchases of Florida citrus plants have been announced by three leading food products firms.

General Foods Corp., New York City, has acquired Florence Foods, Inc., Winter Haven. Plant produces 3,000,000 gal. of concentrate annually.

National Dairy Products Corp., Chicago, has bought Orange State Processing Corp., a specialist in citrus salads. Firm's capacity will be doubled and products marketed under the Kraft label.

The giant Dunedin citrus plant of Minute Maid Corp. has been sold to H. P. Hood and Sons, Boston dairy firm.

Food Laws, Additives In Spotlight At Food & Drug Conference

E. H. Holeman

New Dangers Arise

Accent was on progress at the recent Annual Conference, Assn. of Food & Drug Officials of the U.S. in N.Y.C.

Problems of law enforcement antibiotics, and chemical additives took top billing. But convenience foods and nutrition also sparked lively controversy.

Here are excerpts from pertinent papers:

► More cooperation is needed between state, municipal, and federal food and drug agencies to cope with today's enforcement problems, urged E. H. Holman, 1955 Association president.

Gross flouting of the law is a thing of the past, he continued. But, subtle violations are still with us, as well as new dangers created by increased use of chemicals and antibiotics in foods.

To meet this challenge, he concluded, qualified young men must be attracted to serve in enforcement agencies. Because of inadequate salaries, there is a tremendous deficit of these people in control work today.

► Antibiotics were viewed in another light by A. B. Clow, American Cyanamid Co. He predicted that the time is coming when everybody will take Aureomycin daily, as vitamin tablets are consumed now. This startling statement is based on experiments with animals and humans that show dramatic gains in health and weight when drug is included in the diet.

► Another current danger in foods was emphasized by A. E. Abrahamson, New York City Health Dept. He demanded increased inspection of ready-to-eat products, particularly those prepared in restaurants and delicatessens. "Bacterial contamination in many such operations is particularly apparent," he declared.

► Further comment on convenience foods was heard from two other speakers.

"Housewives of the future will practice cooking only as a hobby," asserted George P. Larrick, FDA Commissioner.

"Not so," said Dr. Ida Bailey Allen, food writer and TV commentator.

(*Turn page*)

Flat Storage Key Feature of New Collapsible Bin

Handling of many fruits and vegetables is seen speeded by a new, collapsible bin, developed specifically for potatoes. Special feature is a hinged corner, permitting rapid collapse of carrier for compact storage. Box runners lock into bin tops for solid tiering. Test units are in two sizes: 1,200 and 2,000 lb. (for potatoes), says National Wooden Box Assn., Washington, D. C.

Opens Modern Warehouse, Headquarters Building

Over 500,000 cases of merchandise can be stored in this 240,000-sq.-ft. warehouse now opened by S&W Fine Foods, Inc., San Francisco. In addition, company's new international headquarters also contains a complete coffee processing plant (20,000 sq. ft.) and two-story administration building (32,000 sq. ft.). Facility can handle 65 trucks and 10 rail cars at one time. Total construction cost: $2,500,000.

Laws, Additives *(Cont'd)*

"Average family food budgets cannot stand the expense of daily TV dinners or special frozen entrees. These would virtually double food expenses."

Dr. Allen applauded the many food processors who have publicized good cookery and nutrition. Yet, she declared, malnutrition is still widespread in this country.

To combat this and further boost food quality, she called for action by food processors and enforcement agencies on these advances, urged by women's groups:

1. Compulsory enrichment of all flour, macaroni, and cereals.
2. Enforce nationwide pasteurization of milk.
3. Insure in-state, as well as interstate inspection and grading of meats and poultry.
4. Complete removal of pesticides from fruits, and vegetables before processing or distribution.
5. Print labels and recipe instructions in larger type.
6. Stiffen uniformity of quality for vegetables packed in window packages.
7. Restock 12-oz. frozen food packages and No. 2½ cans, so one package will feed today's larger family.
8. Keep fresh vegetables, fruits, and seafood under constant refrigeration in the retail store.
9. Reduce elaborate packaging, while retaining protective qualities, to lower retail costs.
10. Use better quality flavorings in prepared foods.

Food-Drug Men Elect

James M. Doughty, Jr., New Mexico Dept. of Health, has been elected 1956 president of the Assn. of Food & Drug Officials of the US.

Other officers: L. D. Oranger, Illinois Dept. of Agriculture, vice-president; E. Wright, Kansas State Board of Health, Topeka, secretary-treasurer.

A-Power Quells M-Theory

With the advent of atomic energy, the ghost of Malthus has been laid to rest for another century, hails Maj. Gen. A. B. Denniston, Deputy Quartermaster General, U. S. Army.

This refers to the famous theory, advanced in 1798, that population increases geometrically, while food supply rises in arithmetic ratio. Thus, in a matter of time, everyone would starve.

Nuclear radiation has defeated this concept, states Gen. Denniston, by leading to new fertilization methods and sharper pest control. It will likewise be important for improving food marketing and desalting sea water for irrigation purposes in the near future.

Dairy Gains and Losses Shown in New Charts

Revealing figures on production and consumption gains in dairy goods are contained in charts just released by American Dairy Assn., Chicago.

The graphs, covering the period 1924-1955, disclose that milk production has closely paralleled population increase—leaping from about 94-billion lb. (1924) to 123-billion lb. in '55.

Consumption figures, however, vary widely with the product. Overall per capita use of dairies (based on milk equivalent) has dropped slightly from 780 lb. in '24 to a present rate of 710 lb. Here's a per capita breakdown by products (figures in parentheses for 1924):

Butter (17.5 lb.), 9 lb.; cheese (4.5 lb.), 7.5 lb.; fluid milk and cream (335 lb.), 350 lb.; evaporated and condensed milk (11 lb.), 17 lb.; non-fat dry milk solids (about ½ lb.), 5.3 lb.; ice cream (9 lb.), 19 lb.

Further, non-farm consumption of fluid milk and creams (total), which is traditionally lower than farm use, has risen spectacularly. It zoomed from 26-billion lb. in '24 to 48.8-billion lb. at present.

Need More Concentrates

Pressing need for lightweight dehydrated and concentrated foods is underlined by Maj. Gen. K. L. Hastings, Quartermaster General of the Army.

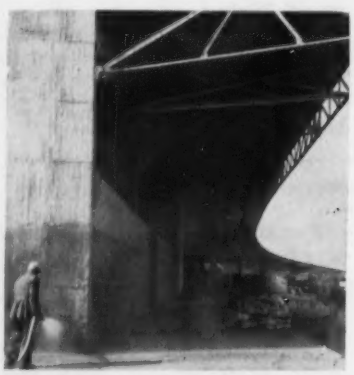
"Modern defense strategy of extreme dispersal necessitates reduction of food tonnage, simplification of supply lines, and elimination of huge food storage and preparation centers," he declares.

Current dehydration experiments by the QMC have resulted in weight reductions as high as 80%—while still maintaining taste and nutrition of the food products.

Mushrooms From Sawdust

A new process for growing mushrooms—using sawdust and oatmeal—is disclosed by S. Block and G. Tsao, U. of Florida researchers.

Adapted from an ancient practice used by the Japanese, the latest system produces 500 lb. of fresh mushrooms in two weeks from only a ton of ordinary saw dust, supplemented with oatmeal. Costs are cut by the shortening of growing times and elimination of composting labor, say the scientists.



Builds Unique Warehouse

Cost-cutting innovations are used in constructing a new 500,000-cu.-ft. addition to Alford Refrigerated Warehouse, Dallas, Tex. First, company's maintenance men do the work, eliminating outside labor. Walls are formed of sprayed concrete. No floor insulation is used, and redwood bark substitutes for cork in walls. These workers built firm's two original warehouses (totaling 15,000,000 cu. ft.) in 1947.

Frozen Fruits, Vegetables Hit Record Figure

An all-time record pack of 1.8-billion lb. of frozen fruits and vegetables was chalked up in '55. This was a 20% jump over '54 figures (1.5-billion lb.), announces the National Assn. of Frozen Food Packers.

In vegetables, peas topped all others, as usual, with 231,000,000 lb. (a 12% gain over '54). But biggest gainer, percentagewise, was cauliflower. It totalled 40,000,000 lb. in '55–135% over 1954's 17,000,000 lb.

In fruits, breakdown follows the usual pattern, with strawberries far in the lead. A good growing year boosted this product pack to nearly 273,000,000 lb., 23% over '54.

Hors d'Oeuvres

▶ **Heinz is chalking up new success records. But then the business got off to a hot start in 1869. The first of the "57" was horseradish.**

▶ Expanding abroad, Heinz has made baked beans a staple of the British diet. And today the English eat more baked beans per capita than we do in the U. S. Boston has paid off its Tea Party debt.

▶ **The Pittsburgh firm's British subsidiary also taught the English to eat salads, with its Salad Cream dressing. And it made processed spaghetti popular there. If this Americanizing keeps up, the British cooks won't have a leg of mutton to stand on.**

▶ Londoners sometimes shock tourists from the U. S. with the remark, "I understand you Americans eat our Heinz foods, too." Like the German war prisoner over here who observed, "Why, you even have Coca-Cola."

▶ **There's still more to the international influence of the House of Heinz. The firm taught the Canadians the technique of large-scale commercial tomato growing. Now it pays Canadian farmers a nice, neighborly $6,000,000 a year for vegetables and fruits.**

▶ And the "57" firm is helping the Aussies to eat better, too. Its baby foods have skyrocketed in demand down under. American influence during the war perhaps has been a factor.

▶ **In celebrating the anniversary of Federal food and drug legislation, the Assn. of Food & Drug Officials of the U. S. pictured the era 50 years ago as one in which to "Eat, drink, and be wary." Changing that last word has been a tremendous achievement.**

▶ While people do not like to dine dangerously, we believe that many enjoy adventurous eating. Since one importer sold 150,000 cans of fried grasshoppers in seven months, we hardly are jumping to conclusions.

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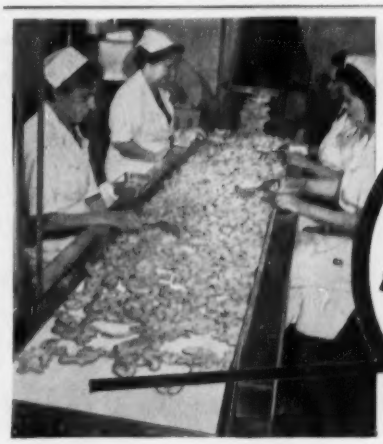

This white Pur-O-Tex belt has proved ideal for conveying and inspecting fruits for mincemeat.

TON-TEX
Pur-O-Tex
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A leading maker of mincemeat has established its reputation and quality of product beyond question. Conveying and inspecting the apples and raisins for the mincemeat is an all-important part of the processing.

This Ton-Tex Pur-O-Tex belt withstands fruit acids, oils and heat. It imparts no odor or taste to the product. And it can be easily washed like new without injuring the belt. Let a Ton-Tex engineer help you choose the right belt for your conveyor jobs . . . a belt that will cut your costs. Write for complete details.

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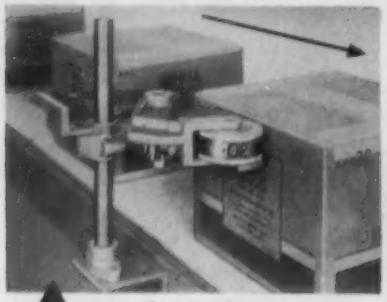
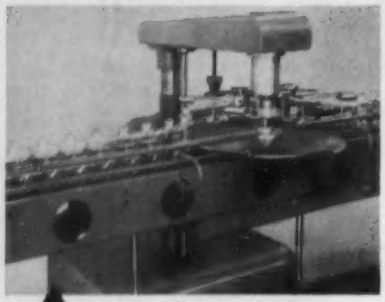
Coding Problem?

There's a Gottscho automatic code-dating machine for every package, every purpose



Side-Coder

This low-cost, friction-driven marker attaches to case-sealer, conveyor, etc. . . . imprints codes, lot numbers, varieties, other legends on side of cartons, cases, drums, filled bags. Model shown (ROLACODER "500" MARKER) codes side and front simultaneously . . . other models code side only or side and rear.



Bottom-Coder

This portable, space-saving unit imprints codes on bottom of jars, bottles, cans, etc. as part of an existing production operation. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will. ("Model TB" MARKO-CODER IMPRINTER).

Other standard *Gottscho* imprinting machines available for top-coding, label-coding, wrapper coding.

Submit details of your coding problem for appropriate literature and our recommendation.

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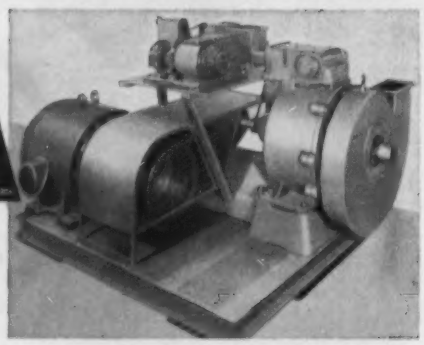

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If your product must be pulverized to ultrafine specifications and yet have controlled particle size distribution, you'll find proven Schutz-O'Neill "Superfine" Pulverizers best for the job.

Many products that are heat sensitive can be pulverized safely too, because the grinding principle of impact with air attrition keeps product temperatures down and helps control humidity.

Versatility of the Superfine Pulverizers makes them adaptable to the complete range of grinding from coarse to ultrafine. Schutz-O'Neill Superfine Pulverizers are used in the paint industry where ultrafine pigments with close particle size range are vital; by major cocoa powder, sugar, spice and pharmaceutical manufacturers; for emulsifier gums, resin, plastic and seaweed extract powders—wherever unexcelled quality grinding is required. Offered in 6 sizes ranging from 7½ to 125 HP with grinding chambers 12" to 28" in diameter.

FREE TEST GRIND OF YOUR PRODUCT in our test lab! Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired. You'll receive back your processed product plus our Engineering Test Report—there's no obligation.

Send for literature on Schutz-O'Neill Pulverizers

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3-A Men Study Standards

Amended standards for milk storage tanks have been approved, announces 3-A Sanitary Standards Committees.

In addition, substantial agreement has been reached on regulations governing evaporators, vacuum pans, separators, standardizers, and clarifiers. And these standards may become official before the December meeting of the joint Committees.

Found not acceptable in present form were rules for farm holding and cooling tanks, fillers and sealers, ice cream and frozen dessert freezers, and coin-operated fluid milk product venders.

Ads Win Safety Awards

Advertising campaigns by five food companies won citations for exceptional service to safety in 1955, announces National Safety Council.

The five leaders, whose advertising media boosted accident prevention, were: Abbotts Dairies, Elkton, Md.; Jewel Food Stores, Melrose Park, Ill.; Pan-American Coffee Bureau, New York City; Schafer's Bakeries, Detroit; and Wm. Wrigley Jr., Co., Chicago.

Consumption Lag Stressed By ADMI Speakers

Differences between production and consumption of non-fat dry milk gained the attention of delegates at recent annual meeting of the American Dry Milk Institute (ADMI) in Chicago.

Consumption of non-fat dry milk hit a new high of 867,600,000 lb. in '55, 20.6% over '54 figures (719,200,000 lb.), declared A. R. Blockhan, ADMI market researcher.

But, he added, use hasn't caught up with production yet. Total output in '55 amounted to 1.5-billion lb., a gain of 5.9% over the '54 figure (820,200,000 lb.).

To close this gap, industry must realize that consumer tastes are changing, stressed Dr. P. H. Tracy, Food Technology Dept., U. of Illinois. For, percentage of older people, 45-years and up, is on the increase.

To capture this market, Dr. Tracy urged industry to boost taste, shelf life, and availability of non-fat products. Further, he called for more attractive packaging and less legal control of such goods. The latter, he charged, has put road blocks in the way of some new products actually desired by the public, injured public relations, and retarded research advances.

Treats Beef With Enzymes

Tenderizing beef, by a combined enzyme and freeze-dehydration process, is object of research by American Meat Institute Foundation, under a contract with QMC.

Started last year, the investigation has already disclosed a technique that achieves efficient enzyme penetration of the meat tissues.

Only tougher cuts of beef are used. And freeze-dehydrated steaks are rehydrated by soaking in water to which proteolytic enzyme preparations have been added.

Pushes Cocoa Coatings

"The confectionery field is declining. One reason is that processors depend on chocolate and cocoa butter products that don't fill the bill during half the selling season," charges J. J. Alikonis, director, Al-Chem Lab., Inc., Bloomington, Ill.

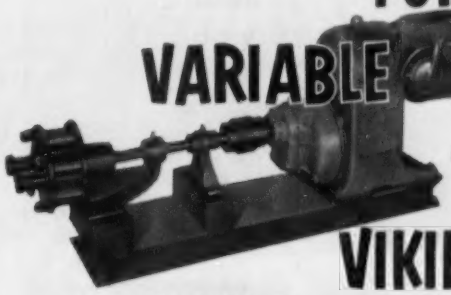
Further use of hard butter coatings, made with cocoa powder, would cure this, he adds.

He cites low price, stability, and various tricks for boosting flavor as advantages for the product. And declares that extensive use of "chocolate-type" coatings would not only stabilize price of cocoa beans for real chocolate products, but would level out seasonal production peaks, giving customers quality candies the year-around.

Pasteur Process Dated

The actual starting date of commercial pasteurization is now revealed by a rare letter, written by Louis Pasteur, as May 1, 1865. In an attack on French critics of his process, Pasteur disclosed that this first industrial use occurred, not in France, but in the U.S. (by a California wine maker). Historic document has been acquired by Fisher Scientific Co., Pittsburgh, and is exhibited in company's food science museum.

FOR VARIABLE DELIVERY



of milk and other food products

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Variable Capacity "Sanitor" Pumps

Check the Figure 177 Viking "Sanitor" pump line when you need a 3A approved sanitary pump that will deliver in variable capacity.

Its slow speed, positive and smooth delivery, means no churning or re-circulating of the liquid or semi-solid handled. With this "Sanitor" you have delivery in the exact amount needed.

Pumps available in sizes that deliver from 4 to 22, 8 to 43, 12 to 62, and 22 to 90 gallon per minute, as well as other ranges.

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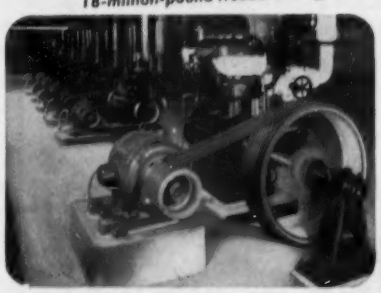
Frick square-finned coils cool the 18-million-pound freezer storage.



Battery of 11 Frick ammonia compressors at So. Mich. Cold Storage Co.

FRICK Refrigeration

Carries the load at the Southern Michigan Cold Storage . . . measuring 324 by 160 feet . . . lately built near Benton Harbor.

Here eleven Frick ammonia compressors quick-freeze 375,000 pounds of foods daily at minus 30 degrees; store 18,000,000 pounds at zero; and hold a 75,000-bushel storage for fresh fruit at plus 30.

The frozen-food storage is cooled with 6,440 feet of the new Frick square-finned ceiling coils. Installation by Hayes Brothers, Inc., Frick Distributors at Indianapolis and South Bend.

Whether you need air conditioning, ice making, quick freezing, or other refrigerating services, you're safest when you specify FRICK. Write now for literature and estimates.

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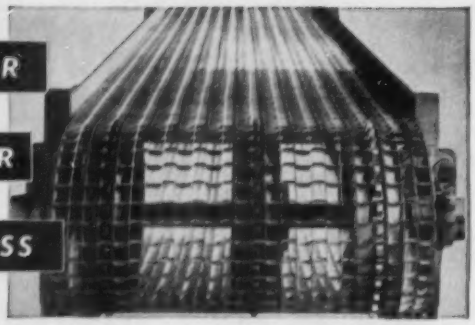

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You are ready for any food process when you install this rugged La Porte Belting. It speeds up every food handling operation from loading bin to shipping dock. It resists loading impacts and provides a perfectly flat surface for containers, empty or filled.

The durable, open mesh, flexible steel construction permits circulation of air and liquids around products in process and facilitates cleaning with steam gun or scalding water. Resistant to heat and cold. Available in any length and practically any width.

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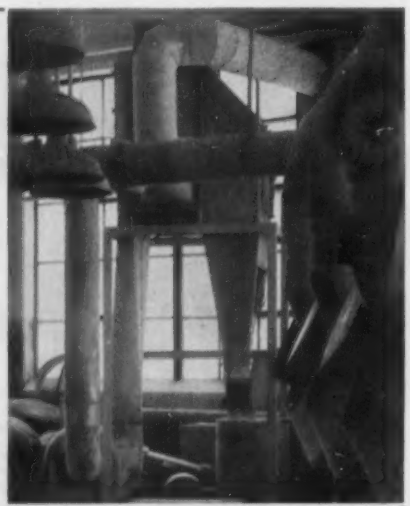
This 25 tube D-450 Dustex collector recovers airborne coating material from 24 coating pans during the manufacture of Doan's Pills at the Foster-Milburn Co., Buffalo, N. Y. The Dustex unit handles 1640 cfm at 80°F with a 6" w.g. pressure drop. Enthusiastic endorsement by coating department employees, reduction of good housekeeping costs, and recovery of material has proven the worthiness of this Dustex collector to management. Operation is maintenance free.



If you have a dust problem that hampers employee efficiency, or results in waste of valuable material, write for information on our simplified test method which proves performance . . . *before purchase.*

P.O. Box 2520 Dustex CORP. Buffalo 25, N. Y.

Licorice Price Rises

Booming labor costs and complications in foreign currency exchange in the Middle East have boosted price of imported licorice roots ½c. per lb.

However, H. W. Tetherbridge, president, National Licorice Co., Brooklyn, told FE that this slight rise will not affect price of his line of candy products.

U.S. imports of the flavoring topped 41,000,000 lb. in '55, a sharp gain over '54 figures (29,100,000 lb.), but still far below the pre-World War II high of 69,600,000 lb. (1937).

Retailers Give Sales Angle In Latest Frozen Survey

Results of a frozen food cabinet survey made by students at Long Island Agricultural & Technical Institute (FE Nov. '55, p. 204) are now released by Eastern Frosted Foods Assn., Inc., N.Y.C.

Questions were put to 100 retail grocers in three L. I. counties. Here's capsule answers of interest to all frozen food processors.

► Best Sales Repeaters: In vegetables, 91% said peas. French fries placed second, snap beans and spinach third. In fruits, strawberries and peaches ran one and two. Orange juice was far ahead of other concentrates.

► Prepared foods: Whole poultry sales

Planter to End Hand Work

Mechanized planting of pineapple slips, which has long baffled engineers, is nearing solution with this experimental machine. The new unit, which is being used by Hawaiian Pineapple Co., travels about 5 mph. and inserts a double row of shoots into ground by means of revolving buckets. Only problem still awaiting solution is that buckets tend to leave an air pocket near the plant.

are slow. Parts of birds move well. Frozen pies—excellent, with chicken leading the field. Fruit pie sales are on the increase. Waffles, good. Chinese foods and chicken a-la-king, low demand.

▶ Selling Grade B frozens: Idea voted down by 92% of retailers. They claim Grade A more popular, despite lower price of Grade B goods.

▶ Small and Large Packages: 51% felt no change was necessary. Larger package was requested by 36%, smaller unit by 13%.

▶ Ways to boost sales of frozens: Retailers say, in part, increase cabinet space, use tie-in sales, educate public in nutritional benefits, heighten attractiveness of packages, boost variety of frozen meats, and maintain high, uniform quality of all goods.

AOCS Picks Leaders

Following officers have been picked by the American Oil Chemists' Society (AOCS) for 1956:

T. H. Hopper, Southern Regional Research Lab, New Orleans, president; H. C. Black, Swift & Co., Chicago, vice-president; R. W. Bates, Armour and Company, Chicago, reelected secretary; A. F. Kapecki, Wurster & Sanger, Inc., Chicago, reelected treasurer.

Packers Protest FDA Rule On Prune Juice Labelling

FDA's proposal that canned prune juice labels bear the statement "water extract of dried prunes" in large type has brought strong protest from packers.

As outlined by FDA, statement would immediately follow product name, and would be in the same style of type, but half the size.

Objections—filed by National Prune Juice Packers Assn., Western Prune Juice Committee, and American Fig & Date Co.—state that the demand is unnecessary and will work a hardship on the packer without benefiting the consumer.

Packers want to use a smaller type size for the offending statement, which is a requirement of an otherwise accepted Standard of Identity, recently formulated by FDA.

New Beverage High in '55

Bottled soft drinks sales hit a new peak of 1,264,925,000 cases in 1955 —up 7.5% over '54—reveals American Bottlers of Carbonated Beverages.

Likewise, per capita use jumped 10 bottles to reach 184.2. This is greatest advance since 1948.

Container size played a big part in gains. For the survey, sizes were grouped into three divisions: Group 1, 6-9 oz. size, gained 3.5%; Group 2, 10-12 oz., jumped 11.9%; and Group 3, 24 oz. and over, advanced 0.4%.

Briefly . . .

● SUGAR QUOTAS for '56 have been advanced 100,000 tons. Total figure now stands at 8,450,000 short tons, raw value, states USDA.

● **ENRICHMENT OF RICE is now required by South Carolina, the first state to make this stipulation. New law takes effect July 1, 1956, and provides for a special label statement cautioning users against washing or rinsing the product.**

● OUTSTANDING MANAGEMENT has drawn citations for four food companies—Campbell Soup Co., General Foods Corp., National Biscuit Co., and Proctor & Gamble Co. —by American Institute of Management.

● **CANDY SPECIFICATIONS have been announced by the U. S. Army**

from SOUP to NUTS...

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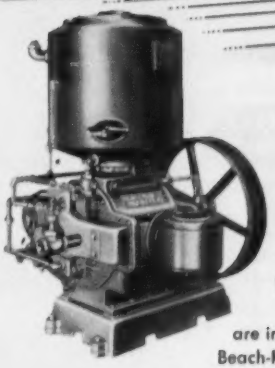

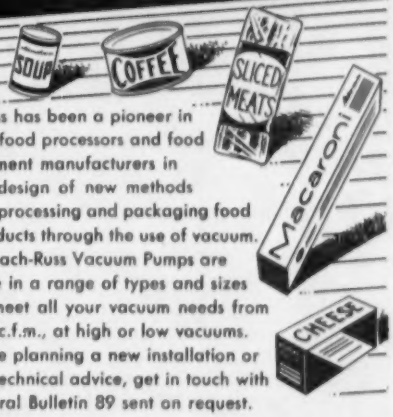

Beach-Russ has been a pioneer in aiding food processors and food equipment manufacturers in the design of new methods of processing and packaging food products through the use of vacuum. Beach-Russ Vacuum Pumps are available in a range of types and sizes to meet all your vacuum needs from 1 to 1800 c.f.m., at high or low vacuums. If you are planning a new installation or are in need of technical advice, get in touch with Beach-Russ. General Bulletin 89 sent on request.

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MATERIALS HANDLING ENGINEERS
WATER STREET • WEST BEND, WISCONSIN

for all candy and chocolate confections. Standards are seen as forming a possible basis for branch-wide specifications by manufacturers.

• PAPER MILK CONTAINERS hit a new production record in '55 of over 11-billion units, states American Can Co. The disposable cartons now carry half of the nation's fluid milk supply to market.

Action on Standards

Following steps have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Sweet cherries, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 12, p. 2371.

Beans, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 17, p. 2461; correction, Apr. 25, p. 2650.

Peanuts; shelled runner, shelled Spanish and shelled Virginia types, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 18, p. 2529.

Southern peas, AMS proposed U. S. Standards, *F. R.*, Apr. 19, p. 2569.

Spinach for processing, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 19, p. 2569.

Spinach, frozen, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 24, 1956.

Fruit preserves (or jams), AMS proposed U. S. Standards, *F. R.*, Apr. 24, 1956.

Fried fish sticks, frozen. AMS proposed U. S. Standards, *F. R.*, Apr. 26, p. 2687.

Clingstone peaches, canned, AMS proposed revision of U. S. Standards, *F. R.*, May 2, p. 2882.

Freestone peaches, canned, AMS proposed amendment of U. S. Standards, *F. R.*, May 2, p. 2889.

Grapefruit juice, frozen, concentrated, AMS proposed revision of U. S. Standards, *F. R.*, May 4, p. 2981.

Poultry and edible products, AMS proposed amendment U. S. Standards, *F. R.*, May 4, p. 2985.

Shell eggs, AMS proposed amendment U. S. Standards, *F. R.*, May 4, p. 2985.

On wheat and hops, proposed tolerances of Zineb, *F. R.*, Apr. 11, p. 2345.

Cheese, Nuworld, FDA Standards of Identity, *F. R.*, Apr. 13, p. 2415.

Pasteurized process cheese, pasteurized process cheese food, pasteurized process cheese spread, cold-pack cheese, club cheese, cominuted cheese, and cold-pack cheese food, FDA amended Standards of Identity, *F. R.*, Apr. 13, p. 2415.

Proposed tolerances and exemptions from tolerances for pesticide chemicals on certain raw agricultural commodities, *F. R.*, Apr. 14, p. 2445.

On beans, corn, melons, peas & cowpeas, legumes for forage, grain sorghum, cranberries, grapes, mangoes, plums & prunes, strawberries, asparagus, carrots, horseradish, parsnips, radishes, salsify root, eggplant, peppers, pimentos, potatoes and sweet potatoes, tomatoes, grains, apples, pears, quinces, cherries, citrus fruits, pineapple, beets, turnips, rutabagas, broccoli, brussels sprouts, kohlrabi, cabbages, cauliflower, salsify tops, celery collards, kale, mustard greens, spinach, swiss chard, cucumbers, summer squash, lettuce and endive, tolerances of dieldrin, *F. R.*, Apr. 17, p. 2464.

On apples and pears, proposed tolerance of sodium-o-phenylphenol, *F. R.*, Apr. 19, p. 2571.

Further extended date on which statute on pesticide chemicals shall become effective, *F. R.*, Apr. 20, p. 2591.

Extended time for filing exceptions to proposed pesticide order, Apr. 24, p. 2636.

On potatoes and grapes, tolerances of 3-(p-chlorophenyl)-1-1-dimethylurea and 3-(3, 4,-dichlorophenyl)-1-1-dimethylurea, *F. R.*, Apr. 24, p. 2614.

On pears, exemption from tolerance of basic copper carbonate, *F. R.*, Apr. 27, p. 2720.

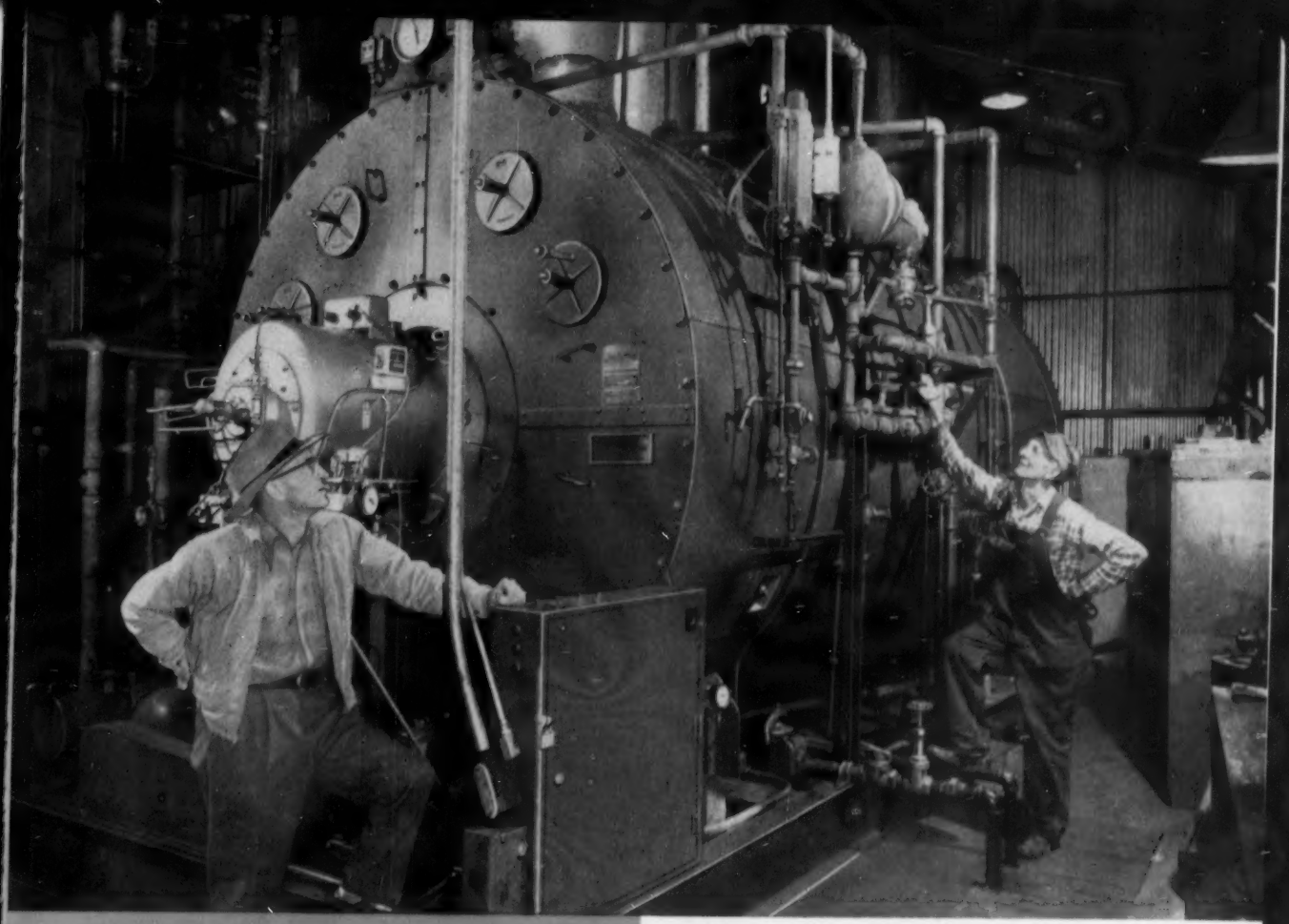
Schedule of Events

June

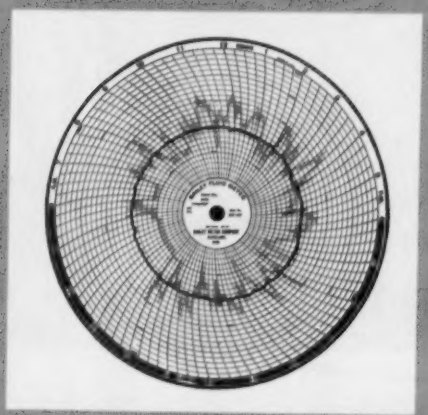
17–30—Annual Material Handling Training Conference; Lake Placid, N. Y.
18–20—Grocery Mfrs. of America; Hotel Greenbrier, White Sulphur Springs, W. Va.
18–21—American Dairy Science Assn., annual meeting; U. of Conn., Storrs.
18–22 International Congress on Food Distribution; Rome, Italy.
20–22—National Macaroni Mfrs. Assn., annual meeting; Wentworth-by-the-Sea, Portsmouth, N. H.
20–22—Processed Apples Institute, annual meeting; Hotel Greenbrier, White Sulphur Springs, W. Va.
25–29—FAO Interim Committee on Fish Handling & Processing, international meeting of technologists; Rotterdam, Netherlands.

July

10–12—Western Packaging & Materials Handling Exposition; Pan Pacific Auditorium, Los Angeles.
23–26—National Assn. of Sanitarians, annual conference & exposition; Hotel Morrison, Chicago.
31–A3—National Dietary Foods Assn.; Huntington-Sheraton Hotel, Pasadena, Calif.



Why does ONE *Powermaster*® sell OTHERS in nearby plants?



This 24-hr. pressure and flow chart shows the ability of the *Powermaster* to hold constant pressure under widely varying steam flow conditions. The basic simplicity and rugged construction of the *Powermaster* modulating burner control promptly adjusts fuel firing rate to steam demand, thus, automatically holding boiler pressure constant throughout the entire steam demand range of the boiler.

This 500 HP *Powermaster* Packaged Automatic Boiler installed in a West Coast food processing plant has led to the purchase of four *Powermaster* units by other companies in the same area.

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in spraying efficiency non-clog nozzles

YARWAY Bar-Stock Involute Nozzles

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Most popular design for cooling, recooling, washing, rinsing, air conditioning, drying and other spraying operations in industrial and processing work and in power plants.

Non-clog involute design has no internal parts (vanes or deflecting plates) on which foreign particles can collect. Special contour of nozzle body guides flow with minimum loss of energy towards discharge opening, where liquid attains maximum velocity and leaves nozzle in a fine hollow-cone spray.

Available in three types:

Bar-stock bronze (shown) for fine spray
Sizes ¼" and ⅜", male or female connection
Capacities up to 3 gpm; pressures 20 to 50 psi

Cast bronze Type B (shown) for air conditioning and small recooling systems
Five sizes, ½" to 1½"
Capacities up to 40 gpm; pressures 7 to 25 psi

Cast bronze Type C (not shown) for spray pond service
Sizes 2" and 2½"
Capacities up to 110 gpm; pressures 7 to 15 psi

YARWAY Type B Involute Nozzles

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Preferred for many washing and cooling operations. Non-clog design, delivers flat fan-shaped sheet of spray with slicing action particularly desirable for surface washing.

Thin sheet of spray is discharged forward 30° from the vertical, spreading in fan shape up to 140°, depending on operating pressure.

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Recent Inventions

PRODUCTS

Shortening Comprising Lard, Animal Lipins, Water, Stearic Acid, Glyceryl Mono and Distearate, Glyceryl Ester of Hydrogenated Vegetable Oil—L. Kiers, Webster Groves, Mo. No. 2,733,149. Jan. 31, 1956.

Coating, Which Prevents Adhesion of Proteinaceous Meaty Materials to Cans During Cooking, Consisting of Polyhydroxyl Alcohol, Partial Ester of Non-Hydroxy Unsaturated Fatty Acid—A. C. Edgar, River Forest, Ill., to Wilson & Co. No. 2,733,152. Jan. 31, 1956.

Meat-Treating Solution Comprising Tartaric Acid, Sodium Hexametaphosphate—W. Bickel, Mannheim, Germany, to Calgon, Inc., Pittsburgh. No. 2,735,776. Feb. 21, 1956.

Fish-Preserving Brine Employing Polymeric Phosphoric Acid—A. Meyer, Ramsen, Germany, to Calgon, Inc., Pittsburgh. No. 2,735,777. Feb. 21, 1956.

Bread-Making Composition Including Dried Cheese Whey, Calcium Carbonate, Calcium Peroxide—R. W. Selman, Jr., and M. K. Landcraft to De-Raef Corp., Kansas City, Mo. No. 2,736,654. Feb. 28, 1956.

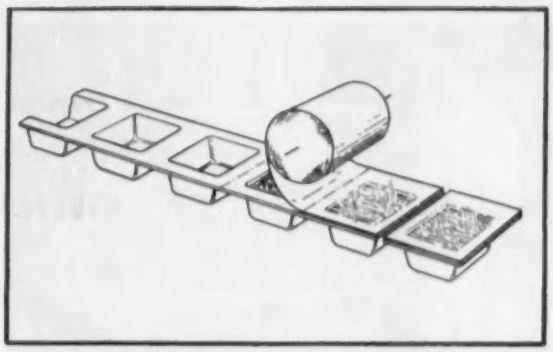
Apple Syrup by Pressing, Adding Catalyst to Juice, Filtering, Concentrating, Separating Essence, Adding Sugar, Returning Essence—M. & L. Gordon, Rhinebeck, N. Y. No. 2,736,655. Feb. 28, 1956.

EQUIPMENT

Dryer for Filament-Shaped Alimentary Paste—A. Fava, Milan, Italy. No. 2,732,627. Jan. 31, 1956.

Large-Scale Culture Unit for Photosynthetic Microorganisms Comprising Light-Permeable, Flexible Limp Tube Supported Horizontally, Means for Admitting Liquid Culture Medium, Gas Nutrient Under Pressure—D. R. Dewey, Lincoln, Mass. No. 2,732,663. Jan. 31, 1956.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.



Plastic Cups Hold Individual Food Servings

Packaging method involves forming a thermoplastic strip into a series of cups with border flanges. Units are successively filled with items such as jelly, mustard, or ketchup. Then, cups are heat-sealed with a continuous cover strip. Cut packets have an extending cover portion that provides a finger grip for peeling.—*J. M. Marshall, Patchogue, N. Y., to Kraft Foods Co., Chicago. No. 2,736,656. Feb. 28, 1956.*

Multitier Pasteurizer Consisting of Casing, Spray Tank, Longitudinal Conveyors, Spray Collectors—G. L. N. Meyer, Milwaukee, to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,732,788. Jan. 31, 1956.

Deep-Fat Fryer With Elongated Vat, Semi-Cylindrical Screen, Helicoidal Conveyor, Rotatable Shaft, Heat and Temperature Control Means, Cooked-Food Lifter, Discharge Chute—C. L. Herberg, to Gifford-Wood Co., Hudson, N. Y. No. 2,732,789. Jan. 31, 1956.

Honey Extractor Including Can, Rotatable Hollow Shaft, Open-Work Frames Attached

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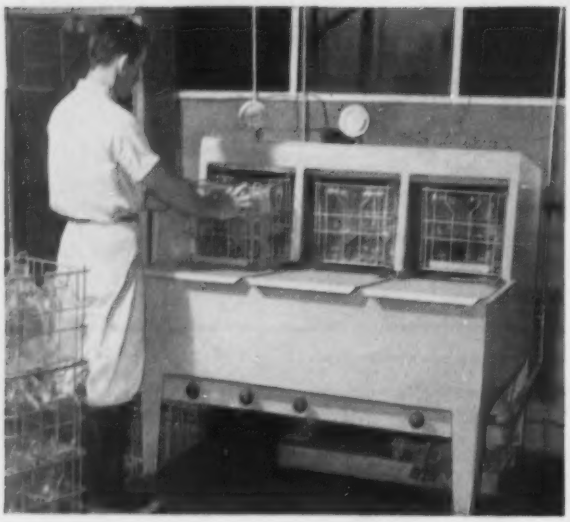

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to Upper, Lower Triangular Plates, Rectangular Comb-Receiving Baskets—O. P. Mandrapa, Calexico, Calif. No. 2,732,945. Jan. 31, 1956.

Apparatus for Forming Tier of Filled, Closed Cans in Various Patterns—A. Horner & P. E. Story to Hawaiian Canneries Co., Kapaa, Territory of Hawaii. Nos. 2,732,956-957. Jan. 31, 1956.

Milk Cooler Employing Dished-Bottom Sealed Tank, Refrigeration Means, Vertical Conduit, Inverted Conical Float, Vacuum Connection, Air-Pressure Agitating Means—T. D. Rowland, Pocatello, Idaho. No. 2,733,048. Jan. 31, 1956.

Steam Cleaner With Closed, Annular Water Chamber, Heating Means, Inlet for Water Under Pressure, Soap and Mixing Chambers, Conduits—J. E. Hartzler, Colton, and C. P. Jeter, San Bernardino, to E. H. Buller, Atwater, Calif. No. 2,733,101. Jan. 31, 1956.

Vegetable-Oil Extractor Comprising Enclosed Casing, Three-Section Fixed Platform, Vacuum and Pressure Means, Mixing Chamber, Conduit, Exit Port, Conveyor—T. Andrews, Driffield, to Rose, Downs & Thompson, Kingston-upon-Hull, England. No. 2,733,136. Jan. 31, 1956.

Apparatus for Anesthetizing Slaughter Animals Consisting of Narrow Passageway, Runway, Entering Platform, Quick-Action Gate, Movable Separation Barriers, Deck Conveyor—L. W. Murphy to Geo. A. Hormel & Co., Austin, Minn. No. 2,733,477. Feb. 7, 1956.

Canned-Food Sterilizer Having Closed Separate Heating, Sterilization, and Cooling Chambers, Continuous Conveyor, Trichloroethylene and Perchloroethylene Mixture Supply, Controls for Temperature, Vapor Level, Condensate—R. H. Stimpson, Pittsburgh, and J. B. Anderson, Mt. Lebanon Twsp., to H. J. Heinz Co., Pittsburgh. No. 2,733,651. Feb. 7, 1956.

Fruit-Lifting Device Including Sets of Intermeshing Pivotly Mounted Tines Dipping Into Water Tank—R. C. Warren, Woodland, Calif., to Hershel, California Fruit Products Co. —No. 2,733,724. Feb. 7.

Tank-Truck Loading Unit Employing Delivery and Return Lines, Education Means—W. W. Sampselle, Kenton, Ohio. No. 2,733,728. Feb. 7, 1956.

Gravity Conveyor With Inclined Rotating Rods That Reduce Friction—D. W. Dryg to General Mills, Inc., Minneapolis. No. 2,733,801. Feb. 7.

Liquid-Seasoning Pump System for Popcorn Machines—S. M. Waas to Manley, Inc., Kansas City, Mo. No. 2,733,841. Feb. 7, 1956.

Centrifugal Liquefier Comprising Frame, Annular Wall, Rotatable Table, Heating Means—F. Bryant, E. Orange, to Bryant Machinery Corp., Jersey City, N. J. No. 2,734,502. Feb. 14, 1956.

Apparatus for Separating Meat From Bones Consisting of Container, Impact Portion, High-Speed-Oscillation Means—H. F. Geisler, Tucker, to Meat Separator Corp., Atlanta, Ga. No. 2,734,537. Feb. 14.

Fruit Grater Having Hopper, Rotatable Cutter, Pivoted Member With Concave Element, Spring—O. H. Wallingford, Auburn, Me. No. 2,734,538. Feb. 14, 1956.

Salt Dissolver Including Feed Chamber, Settling Portion, Material-Support Bed, Screen, Water Inlet, Top Brine Outlet—T. F. Courthope and R. G. Sickly, Genesco, and S. Martin, Retsof, N. Y., to International Salt Co., Scranton, Pa. No. 2,734,804. Feb. 14, 1956.

Frying Tank With Rotatable Shaft, Carrying Arm, Lever Means for Keeping Food Submerged in Oil—A. S. Brenner, Chelsea, Mass., to Donuts, Inc., Boston. No. 2,735,355. Feb. 21, 1956.

Confection Machine for Applying Chocolate Coating and Nuts to Ice Cream Cones—J. B. Orrell, Los Angeles, and A. E. Wilshusen, Whittier, Calif., to Drumstick, Inc., Fort Worth, Tex. No. 2,735,398. Feb. 21, 1956.

PROCESSES

Making Monoglycerides by Reacting Fatty Materials With Excess Polyhydric Alcohol in 170-C. Mixture of Dioxane, Basic Metal Soap Catalyst—G. Y. Brokaw, and M. I. Van Graafeiland, to Eastman Kodak Co., Rochester, N. Y. No. 2,732,387. Jan. 24, 1956.

Treating Gum-Containing Fatty Oils With 0.01% Sodium Hydrosulfite to Condition Gums for Refining—F. S. Sadler, Savannah, Ga., to Sharples Corp. No. 2,732,388. Jan. 24, 1956.

Increasing Yield of Lipids in Green-Algae Cultivation, Which Also Produces Protein and Carbohydrate, by Keeping Concentration of Soluble Fixed Nitrogen at 0.001 Molar Until Desired Cell Count Is Obtained, Continuing Cultivation at Lower Fixed-Nitrogen Level—H. A. Spoehr, and H. W. Milner, Palo Alto, Calif., to Carnegie Institution of Washington, Wash., D. C. No. 2,732,661. Jan. 31, 1956.

Culturing Photosynthetic Microorganisms by Exposing to Light Source Aqueous Suspension (Having Nutrients) in Thin Recirculating Layer—J. E. Myers and J. N. Phillips, Jr., Austin, Tex., to Carnegie Institution of Washington, Wash., D. C. No. 2,732,662. Jan. 31, 1956.

Forming Mozzarella Cheese by Cutting Curd in Hot Water, Heating to Soft-Melting Stage, Mixing With Continuous Stretching, Cutting to Form Spaced Blocks in Slab, Holding Blocks by Membrane of Cheese, Cooling, Brining, Drying, Cutting—R. A. Russo, Astoria, N. Y. No. 2,733,148. Jan. 31, 1956.

Preserving Eggs by Subjecting to Sterile Sand and Water Spray, Rinsing With Hot Water, Drying—H. A. Mulvany, Berkeley, Calif. No. 2,733,150. Jan. 31, 1956.

Shaping Meat by Compacting Pinned Body in Mold, Freezing Under Pressure—C. A. Hammerberg, Des Plaines, Ill., to Armour & Co., Chicago. No. 2,733,153. Jan. 31, 1956.

Preventing Deposition of Calcium Carbonate and Magnesium Hydroxide Scales on Heating Surface of Evaporator Handling Sea Water by Adding Sea-Water-Soluble Salt of Iron, Aluminum, or Zinc—H. Hillier and F. B. Ling, to G. & J. Weir Ltd., Glasgow, Scotland. No. 2,733,196. Jan. 31, 1956.

Refining Vegetable, Animal, and Synthetic Fats and Oils by Passing Gas-Permeated Mixture Through Series-Connected Treating Zones—A. Milbers, Bad Homburg vor der Hohe, and K. Sondermann, Sprendlingen, Kreis Offenbach, to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany. No. 2,733,253. Jan. 31, 1956.

Freezing Ice Cream Continuously by Agitating Alternate Slugs of Mix and Air Under Refrigeration—E. Thompson, Jr., New Rochelle, N. Y., to Emery Thompson Machine and Supply Co., New York City. No. 2,735,276. Feb. 21, 1956.

Preventing Adhesion of Foods to Inner Can Surfaces During Cooking by Coating Container With N-Acyl Cycloimidine Compound—A. C. Edgar, River Forest, and H. T. Spannuth, Chicago, to Wilson & Co. No. 2,735,354. Feb. 21, 1956.

Cross Sheeting of Dough by Rolling Into Flat Sheet, Advancing, Revolving Horizontally, Rolling, Curling—F. F. Hansen, Pittsburgh. No. 2,735,382. Feb. 21, 1956.

PACKAGING

Glass Container and Closure With Side-Wall Terminating in Annular Rim, Primary and Secondary Sealing Surfaces, Annular External Bead, Sheet-Metal Closure, Annular Depending Skirt, Sleeve-Type Gasket—J. Hohl, Toledo, Ohio, to Owens-Illinois Glass Co. No. 2,731,165. Jan. 17, 1956.

Cap Fastener Consisting of Shaft and Chuck Coupled by Polygonal Head on Shaft, Similar Member on Chuck—R. P. Ranney, San Rafael, and D. H. Reese, El Cerrito, Calif., to California Research Corp., San Francisco. No. 2,731,185. Jan. 17, 1956.

Dispensing Milk Container Comprising Paperboard Carton, Pouring and Wall Panels Connected by Common Score Line, Severably Attached Lift Tab, Fixed Opening Ply—C. R. Alden to Ex-Cell-O Corp., Detroit. No. 2,731,188. Jan. 17, 1956.

Packaging Cylindrical Objects in Carriers by Folding Flat Blank to Form Channel-Shaped Receptacle, Registering Juxtaposed Containers With Spaced Openings, Closing—G. C. Currie to Dacam Corp., Charlotte, N. C. No. 2,731,776. Jan. 24, 1956.

Label Dater Employing Rock Shaft, Stamp Holder, Support, Inking Elements, Synchronizing Means—S. T. Carter, Worcester, Mass., to Geo. J. Meyer

Special "Vest-Pocket" controls for **HAZARDOUS LOCATIONS!**

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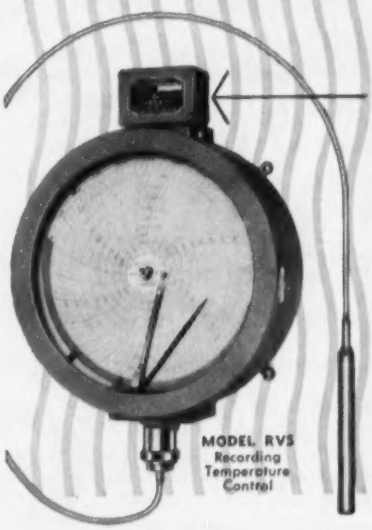
SELF-ENCLOSED SWITCH mounted on control . . . one low cost . . . no bulky extra enclosure to buy or make room for.
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Vest-pocket size! Vest-pocket price! Recording, Indicating and Non-Indicating Explosion-proof Controls for use with gas, oil, steam or water valves, or with electrical equipment. −30F to 1200F ranges. Single pole double-throw switch permits use in two-wire or three-wire circuit; or in two-wire AC circuits, with extra terminal for actuating signals, timers, stirring mechanisms, dampers, etc. when control temperature is reached.

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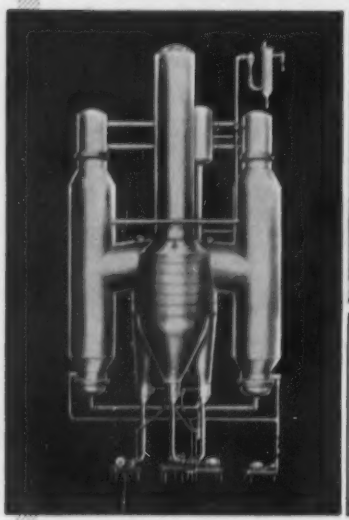
Mojonnier

Lo-Temp Evaporator (Still)



Mojonnier LTS8 Lo-Temp installed in plant of J. Wm Horsey Corporation, Plant City, Fla.

may be the right answer for your product, too

principle of operation

Evaporating temperature rarely exceeds 75°F, and in certain applications the temperature is as low as 45°F. Temperature of heating medium is never over 108°F. This low temperature eliminates all possibility of overheating film clinging to the inside of evaporator tubes, avoiding any product damage.

High quality products now being produced at low cost with the

Mojonnier LO-TEMP EVAPORATOR:

FROZEN, CONCENTRATED CITRUS JUICES —Orange, Lemon, Grapefruit, Pineapple.

BIOCHEMICALS—Penicillin, Female Hormone Extract (Estrogen), and various antibiotics.

INSULIN—Higher Quality, Higher Potency.

MILK CONCENTRATE—5 to 1 Skim Milk, 3 to 1 Whole Milk (ahead of Spray Dryers).

COFFEE EXTRACT CONCENTRATE — Excellent Flavor. High Solubility.

VANILLA EXTRACT CONCENTRATE—High Total Solids. Small Loss of Alcohol.

Mojonnier engineers and consultants will be glad to discuss your product problems with you. Bulletin 300 contains full information about the Lo-Temp Evaporator. Send for it now. Write:

MOJONNIER BROS. CO.
4601 W. Ohio St., Chicago 44, Illinois

QUALITY **Mojonnier** YOU CAN TRUST

Lo-Temp Evaporators

Pioneers of Progress in Food Technigeering

Mfg. Co., Cudahy, Wis. No. 2,731,913. Jan. 24, 1956.

Tomato Tray Comprising Foldable Blank Scored to Form Bottom, Side, and End-Walls, Corner and End Panels, Integral Tab, End Wing, Locking Tongue—M. Glazer, Norfolk, Va. No. 2,732,120. Jan. 24.

Bag Packer and Sealer With Bag Support, Vertically Movable Plunger, Bag-Distension Means, Suction and Liquid-Supply Nozzles, Gripping and Sealing Means—E. Feinstein, New York City. No. 2,732,988. Jan. 31, 1956.

Bag Filler Having Hopper, Auger, Horizontally Extending Spout, Floating Frame, Flexible Seal—E. M. Lau, Dalton, to Black Products Co., Chicago. No. 2,733,040. Jan. 31, 1956.

Food Package Consisting of Form-Sustaining Jacket of Flexible Plastic Film Adhered to Wax-Coating Ply—R. A. Zuercher, Park Ridge, Ill. No. 2,733,151. Jan. 31, 1956.

Flexible-Package Sealer Employing Rotatable Horizontal Nozzle, Suction Means, Reciprocating Clip-Applying Head, Clip Feed, Crimping Jaws—A. G. Russel and F. A. Clary, Jr., Bristol, Conn., F. B. Casey, Concord and R. E. Dallon, Lawrence, Mass., to W. R. Grace & Co. No. 2,733,564. Feb. 7, 1956.

Transfer Roller, Picking Unit Having Label-Receiving Surface, Gum-Applying Roll, Synchronizing Means—C. Holm, Worcester, Mass., to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,733,683. Feb. 7.

Automatically Sealable Tube for Dispensing Plastic Material Having Shoulder, Flattened Neck, Spring-Held Hermetic Closure—V. T. Ohrstrom to A. B. Svenska Kapsylfabriken, Stockholm, Sweden. No. 2,733,837. Feb. 7, 1956.

Sanitary Bottle Closure Comprising Shrinkable Seal Extending Over Crown and Reinforcing Ring—G. L. N. Meyer, Milwaukee, to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,734,650. Feb. 14, 1956.

Bottle-Cap Feeder Employing Reciprocable Suction-Cup Plungers and Pistons, Pressure-Control Valve, Actuating Means—F. A. Ray to Mid-West Bottle Cap Co., Belvedere, Ill. No. 2,734,674. Feb. 14, 1956.

Draw from the Nutting Library of Material Handling Helps

Jr. Catalog 56 G—General Purpose, Warehouse Trucks, Casters and Wheels

Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

Bulletin 54-TL—Trucks for Use with Overhead or Under-Floor Powered Conveyors.

65 years of materials handling "know-how" are built into over 1000 models of Nutting Trucks. You benefit by perfect adaptability to the job, easier handling, long life and minimum maintenance. Write for the literature that covers your problem.

Export Sales Representative:
SCHEEL INTERNATIONAL, INC.
4261 North Lincoln Ave., Chicago 18, Ill.

Nutting Since 1891

NUTTING TRUCK & CASTER CO.
3132 DIVISION ST., FARIBAULT, MINN.

Men & Companies

Industry

Brand & Hardin Flour Mill, Saginaw, Mich., owned by **Frutchey Bean Co.,** Saginaw, suffered $75,000 damage in a fire.

Calif. Walnut Growers Assn. expects to complete its 550,000 sq.ft. production building in Stockton, Calif. by July 1.

Christian Bros., Mont LaSalle, Mapa County, Calif., have acquried St. Helena and Calistoga vineyard holdings of **Charles Forni & Sons.**

General Mills, Inc, plans to start construction immediately on an addition to its cereal and cake mix packaging facilities at Lodi, Calif.

Gerber Products Co., Rochester, N.Y., has announced a $250,000 expansion project which will increase its canning operations by ⅓ this year.

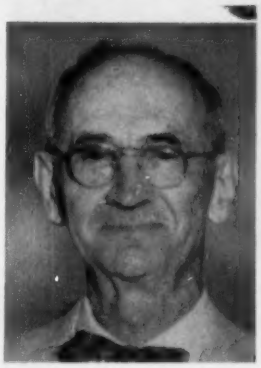
Hawaiian Pineapple Co. has announced its intention to acquire "several more" mainland fruit and vegetable canneries this year.

H. J. Heinz Co. has formed a new Southeastern sales region with headquarters in Jacksonville, Fla.

Hygrade Food Products, Inc., Montreal, plans to complete a meat-packing plant superstructure at estimated cost of $600,000.

King Midas Flour Mills, Minneapolis, will construct a grain-cleaning plant at Hastings, Minn.

Orville Pickens, formerly with Wilson & Co., has joined the staff of Kitchens of Sara Lee, Inc., Chicago, as head of research and new products department.



Dr. Howard C. Parmelee, who helped found "Food Industries" (now "Food Engineering") and was editor of "Chemical Engineering's" predecessor, "Chem & Met", has been honored by the Council of the American Institute of Chemical Engineers. At the council's national meeting Dr. Parmelee was presented with a ruby studded emblem to mark his services as secretary.

Kroger Co. will build a food distribution center on a 15 acre plot in Livonia, suburb of Detroit, and a warehouse and office building in Salon, Ohio on a 47 acre tract.

Lady's Choice Foods, San Francisco, has purchased **Rudolph Stenzel Pickle Co.,** San Leandro, Calif.

Langfield Co. recently opened its fifth frozen food distributing center in San Leandro, Calif.

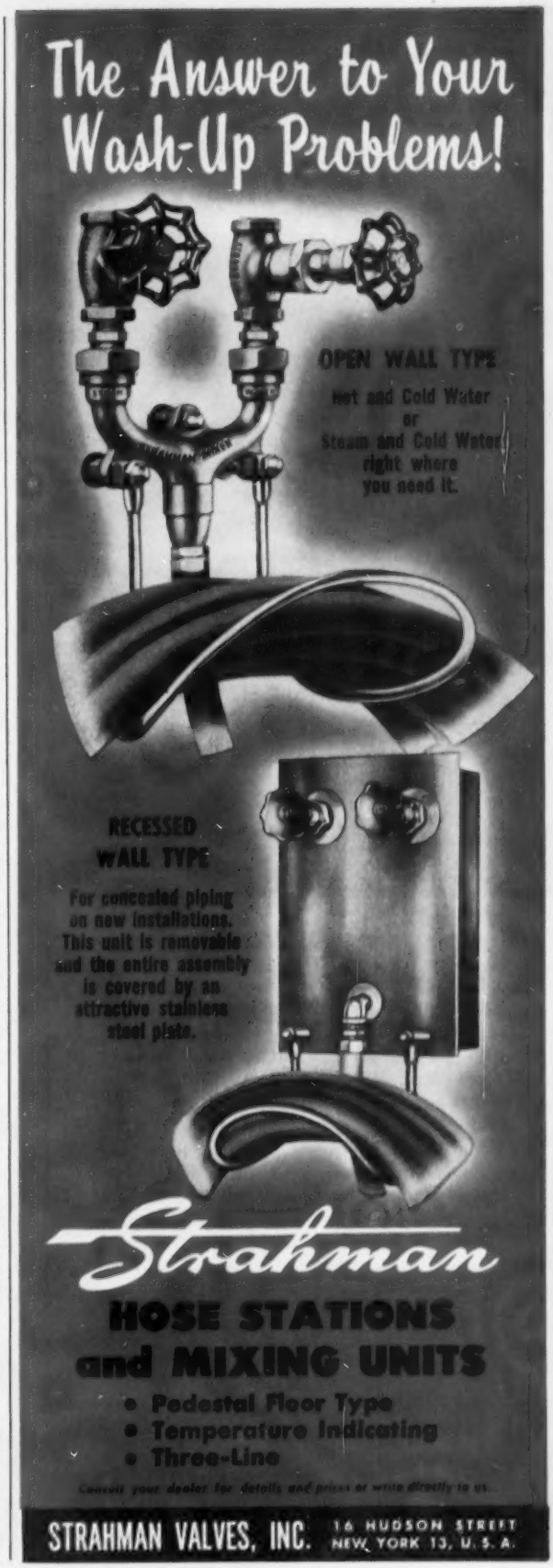
Libby, McNeill & Libby has acquired the **Rockfield Canning Co.** with plants at Rockfield and Jackson, Wis.

Northern Wayne Coop, Inc., Rochester, N. Y., has begun work on a $300,000 annex to its plant in Sodus, N. Y. to include a fruit processing plant and two warehouses.

Penn Packing Co., Philadelphia, will construct a $250,000 meat-packing plant.

Pepsi-Cola Syracuse Bottlers, Inc. has opened its new plant in Syracuse.

Woolson Spice Co., Toledo, has announced acquisition of **James H. Forbes Tea & Coffee Co.,** St. Louis.


The Answer to Your Wash-Up Problems!
OPEN WALL TYPE
Hot and Cold Water or Steam and Cold Water right where you need it.
RECESSED WALL TYPE
For concealed piping on new installations. This unit is removable and the entire assembly is covered by an attractive stainless steel plate.
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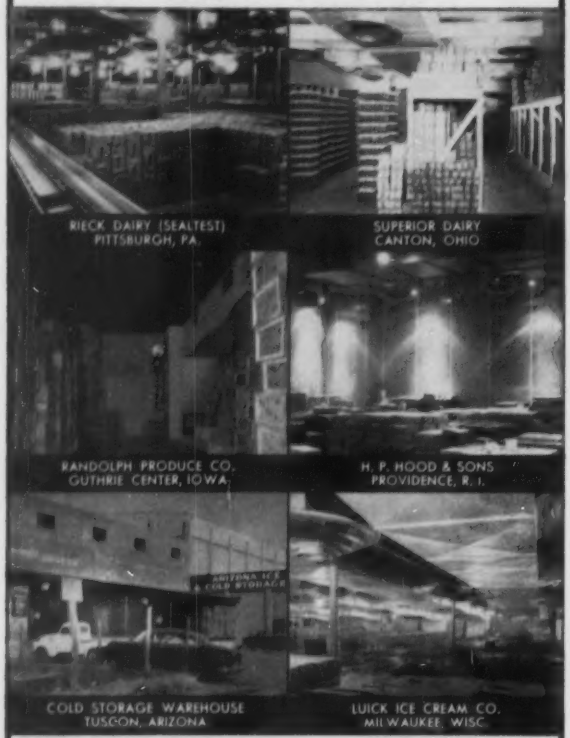
These food plants chose

KING SHARP FREEZE SYSTEMS



Here's why...

King systems give you faster freezing, no defrosting shut-downs, engineered distribution of cold air, simplified and low cost handling in freezing room, increased freezing room capacity, uniform temperature and air movement, frost free rooms with clean merchandise, minimum service requirements. King systems help you speed up inventory turnover, retain freezer quality and flavor, adapt simplified handling, save valuable productive space, reduce labor and power costs.

Originators of modern, efficient air-defrost sharp freeze systems for food, ice cream and cold storage plants.

Write today for further information. Our engineering staff is at your service.

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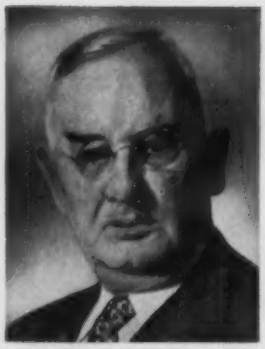

H. W. Adams (left) has been elected president and general manager of Deli Food Specialties Co., Beloit, Wis., and **David Nuciforo** (right) named vice-president in charge of office and plant operations.

Personnel

W. Hoyt Baird, former executive vice-president, has been named president of Mrs. Bairds Bakeries, Dallas, Tex.

W. Gardner Barker has been appointed vice-president of Thomas J. Lipton, Inc.

Fred C. Baselt, American Can Co., has been installed as president of Amer. Soc. of Brewing Chemists.

Dr. William Bradley, American Instit. of Baking, has been elected president of Food & Container Instit. and American Assn. of Cereal Chemists.

George Carter, president of Pilsener Brewing Co., has been elected a director of City Products Corp.

Fred Crosby has been promoted to executive v.-p. of Ocoma Foods Co., Omaha.

Harold Fox, former v.-p. and director of Fox De-Lux Foods, has joined Howard Golz & Co., Chicago, as v.-p. heading the newly created Fox Gold Foods Div.

Mortimer Fuller, Jr. has been elected v.-p. and treasurer of International Salt Co., Inc., Scranton, Penna.

Al Harris has been named vice-president of Canadian Ace Brewing Co., Chicago.

William Jacob, Jr. has been appointed vice-president of Foods Div., Anderson, Clayton & Co.

Walter Jacobsen has been named to succeed **Charles Whitson,** who is retiring, as manager of Borden Co.'s Flavor Dept., Brooklyn.

E. M. Leaver has been elected president of Kellogg Sales Co., Battle Creek, Mich., and v.-p. of sales for Kellogg Co., the parent organization.

Mrs. Lita Loeser has been named director of recently completed Brick Oven Kitchen of Arnold Bakers, Inc., Port Chester, N.Y.

William Lohman, Jr. has been elected vice-president of General Mills, Inc., Minneapolis.

W. Stanley Macklem, former vice-president in charge of production, has been named president of Curtice Bros. Co., Rochester, N. Y. **Howard Cuming,** previously president, has been upped to board chairman, succeeding **Douglas Townson** who is retiring.

Frank Maestri is now director of industrial relations for Dole Hawaiian Pineapple Co.'s mainland operations.

Wesby R. Parker has been appointed executive vice-president of Dr. Pepper Co., Dallas, Tex.

Donald Pascal has been named executive v.-p. of National Starch Products, Inc., New York City, and **William Buffing** made treasurer of the firm.

Jerome Rosefield, v.-p. and general manager of the firm's Skippy Peanut Butter Div., has been elected a director of Best Foods, Inc., New York City.

Richard Speirs has been elected president of Abbotts Dairies, Inc., Philadelphia, and **Ridgway Kennedy, Jr.,** chairman of the board.

Edward Truschke has joined the laboratories staff of the American Instit. of Baking where he will work as an analytical chemist.

Clifford Wayne is now v.-p. in charge of operations for Southern Dairies, Inc.

Leonard Wolf has been named president of newly incorporated Letty Lane Co., Inc., Westville, N.J.

Associated Industries

Amos-Thompson Corp., Edinburg, Ind., has announced plans for a $1 million plant.

Anchor Hocking Glass Corp., Lancaster, Ohio, will build a 66,000 sq.ft. warehouse at its Connellsville, Penna. plant.

Borg-Warner Corp., Chicago has elected Robert Ingersoll president.

Cochran Foil Co., Inc., Louisville, has named Merrill Grogel general manager of its products div.

Crown Zellerbach Corp., San Francisco, has elected E. W. Erickson and Vertrees Young v.-p.s.

Evans Research & Development Corp. is expanding it research personnel and laboratory space.

Fischer & Porter Co., Hatboro, Penna. has completed its decentralization program with formation of an **Instrument Div.**

Food Machinery & Chemical Corp. has established a company at Valencia, Spain to manufacture fruit and vegetable packing house equipment.

John M. Krno, v.-p. of Corn Products Sales Co., has been chosen to receive the Stroud Jordan Medal Award, presented annually by American Assn. of Candy Technologists to the person contributing most to the confectionery field.

Charles McCann, former product manager of Standard Brands, Inc., has joined the Foods Div. of Lever Bros. Co. as product group manager.

Food Research Labs., Inc., Long Island City, has appointed Dr. Myron Brin chief biologist.

Nat'l Adhesives, (Canada) Ltd., has elected Berkley Schaub president.

Nat'l Can Corp., Chicago, has appointed Hiel Pugh director of industrial relations.

Nat'l Container Corp., Jacksonville, Fla., has begun a 5 year expansion program to double the capacity of its kraft paper mill.

Rap-in-Wax Paper Co., Minneapolis, has elected Reed MacKenzie secretary and asst. treasurer.

Reynolds Metals Co., New York City, has announced plans for a new aluminum foil plant at Torrance, Calif.

Trane Co., La Crosse, Wis., has elected Allen Menke vice-president.

Wis. Alumni Research Found. has added Dr. John Birdsall to its staff to specialize in flavor evaluation.

Deaths

Ferdinand C. Arens, 80, retired master brewer of Goenner & Co., Johnstown, Penna., —May 6.

Mah Chena, 58, founder and president of Mah Chena Corp., Chicago.—April 25.

Charles LaBarge, 71, founder of Chateau Cheese Co. & Laurentian Dairy.

PENFORD CORN SYRUPS

- Penford Crystal Corn Syrup
- Nectose Corn Syrup
- Douglas Confectioners' Thin Boiling Starch
- Douglas Confectioners' Moulding Starch
- Douglas Confectioners' Special Moulding Starch
- Douglas Pure Food Powdered Starch

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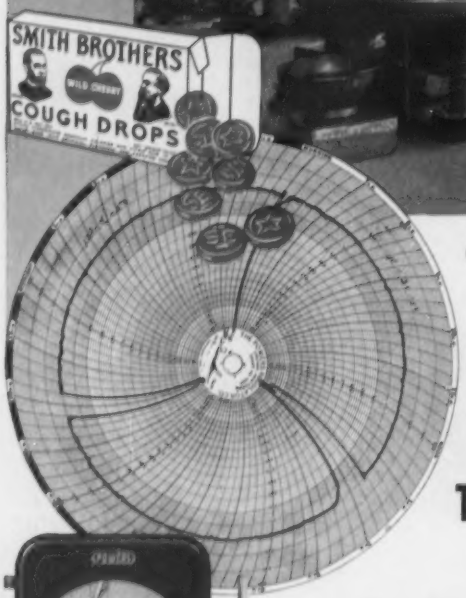

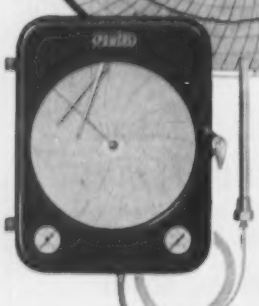

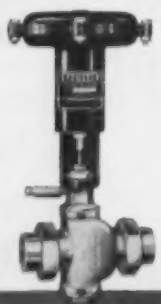

Temperature Chart shown above indicates type of control obtained at Smith Brothers with Powers Recording Temperature Regulators.

At right: Powers FLOW-RITE Diaphragm Valve.

Cooking of the "World's Best-Tasting Cough Medication" Is Automatically Regulated by

POWERS

Temperature Recording Regulators

They Save Labor—Help Insure Uniform QUALITY

For 104 years Smith Brothers cough drops have been famous for good flavor by seekers of cough relief. When Smith Brothers sought relief from the errors and losses of manual control of cooking operations they installed Powers Recording Regulators in their plants at Michigan City, Ind. and Poughkeepsie, N. Y.

When you want better temperature or humidity control for

AIR CONDITIONED process or packaging rooms
DRYERS, drying, curing or chilling rooms • COOKING tanks, vats, retorts or kettles • WATER TEMPERATURE CONTROL—for every requirement

. . . contact your nearest Powers Office. There's no obligation. With 60 years of experience and a wide variety of self operating and pneumatic controls we may be able to help you select the best equipment for your requirements.

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65 Years of Temperature and Humidity Control • Offices in Over 60 Cities • See Your Phone Book

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Just Off the Press

New Catalogs and Bulletins
— Free for the Asking —

PLANT ENGINEERING

Right-Angle Gear Drive

Colorful bulletin shows cutaway view of a right-angle power transmission unit for vertical turbine pumps. Individual photos show key features. 8p—*U. S. Electrical Motors, Inc., Los Angeles. (215A)*

Roller Bearings

Catalog details a wide range of self-aligning roller bearings. It includes engineering data, load rating tables, and exploded views to aid parts identification. Catalog 55, 72p.—*Chain Belt Co., Downers Grove, Ill. (215B)*

Non-Clog Centrifugals

Description of a line of vertical, horizontal, and close-coupled pumps for handling solids in suspension. Applications include waste, drainage, and sewage fluids. Diagrams show full details. Bulletin 121-A, 8p.—*New York Air Brake Co., Aurora Pump Div., Aurora, Ill. (215C)*

Centrifugal Pumps

Detailed performance tables give selection data for a line of end-suction centrifugal pumps. Units range from 1- to 5-in. discharge size and capacities from 2 to 1,000 gpm. Various construction features are noted. Bulletin 4011-A, 12p.—*Deming Co., Salem, Ohio. (215D)*

Explosion-Proof Motors

Lists advantages and shows construction of a series of standard, geared, and varible-speed explosion-proof motors. 4p.—*Sterling Electric Motors, New York City. (215E)*

Chlorine Gas Feeder

Presents high capacity chlorinator for accurately controlling and metering chlorine gas to plant water systems. Colored diagram illustrates operational layout. Bulletin 840-J8A, 4p.—*Builders-Providence, Inc., Providence, R. I. (215F)*

Storage Silos

Illustrates installation, operation and construction of glass-lined storage silos. Units are equipped with mechanical unloaders. Tables give full dimension figures. Bulletin PSU-220, 6p.—*A. O. Smith Corp., Kankakee, Ill. (215G)*

Vertical Pump Motors

Colorful catalog illustrates and describes a series of vertical turbine pump motors sized from 1½ to 400 hp. Individual components are detailed. Bulletin 1903, 16p.—*U. S. Electrical Motors, Inc. Los Angeles. (215H)*

Plant Paging System

Interesting bulletin tells where and how to use various horn, chime, bell, and light devices for signalling plant personnel. Three-way wheel chart aids selection. Bulletin 100, 8p.—*Federal Sign & Signal Corp., Chicago. (215I)*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—front of book. Then sign at the bottom and mail.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Packaged Electric Plant

Gives full facts on a series of electrical generating plants, powered by internal combustion engines, having a capacity range from 5 to 250 kw. Automatic or manual starting available. Bulletin 955, 8p.—*Fermont Machinery Co., Inc., Ramapo, N. Y. (215J)*

Can-Body Formers

Illustrates and describes wide line of body-makers, power formers, and duplex seaming presses for medium and high-speed can-making lines. Automatic and semi-automatic units are shown. Catalog 36B, 16p.—*E. W. Bliss Co., New York City. (215K)*

Rubber Pipe Connections

Details construction and uses of wire-reinforced rubber pipe for eliminating noise and vibration in water lines. Photos show application of the connectors, table gives pertinent facts. Catalog FZ-55, 4p.—*T. R. Finn & Co., Inc., Hawthorne, N. J. (215L)*

Colloidal Mill

Presents detailed description of a stainless steel colloid mill designed primarily for the paint industry. Unit seen applicable to food industry operates at 5,000 to 8,000 psig. Pictures show component parts. Bulletin F-M-B-55, 4p.—*Manton-Gaulin Mfg. Co., Everett, Mass. (215M)*

Why throw emulsifier away?

If the shortening manufacturer dares not add his emulsifier *after* the deodorization step, he must figure on losing part of it in the deodorizer.

The way to avoid this is to use the unique *Myverol® Distilled Monoglycerides*. With this particular emulsifier there is no worry about odor, taste, or stability. Molecular distillation takes care of that. So there is no need to make up for what will wind up in the deodorizer condensers.

Deodorizer savings are only part of it. There are even bigger reasons why the concentrated mono of *Myverol Distilled Monoglycerides* goes a great deal farther than do the common mono-diglyceride mixtures. The only

real way to know how much less *Myverol* it takes to do a given job is to send for a sample and do some comparison testing. Not only is there money to be saved, but better quality commercial and household shortening to be turned out—better quality due in part to more uniform mono content.

For that sample, write *Distillation Products Industries,* Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

Also . . . vitamin A in bulk for foods and pharmaceuticals

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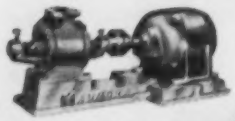
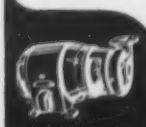
"TOPS" by EVERY TEST

Capacities to 150 G.P.M.

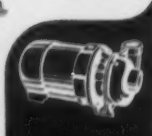


Heads to 600 Ft.



APCO Two Stage Pump for High Pressure Service

APCO is the highest development of the Turbine-Type Pump. Unsurpassed for small capacity high head duties. Handles non-lubricating liquids almost indefinitely without wear. Suited to "1001" duties. Write for Bulletin 111 or Condensed Catalog "M".



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We carry representative sizes of APCO's in stock in No. 316 Stainless Steel for prompt shipment.

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TOUGH HEAT TREATING JOB?

here's a belt to lick it

New and improved Wissco Rod Reinforced Belts are built extra big and rugged . . . to carry heavy loads through the furnace.

Wissco's IMPROVED THIN SPIRALS effectively resist stretch and distortion. DUAL CONTINUOUS REINFORCING RODS put an end to narrowing.

We can furnish improved Wissco Reinforced Every Spiral Belts in any high-temperature alloy to meet your particular heat treating problem.

THE COLORADO FUEL AND IRON CORPORATION
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WISSCO BELTS

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

Equipment Fabrication

Depicts construction of various custom-made processing units. List details many metals, equipment, and machining operations available with the service. Bulletin 561, 4p.—*General Alloys Co., Boston.* (216A)

Chemical Feeder

Leaflet considers advantages and operation of a plastic pump for proportioning sanitation chemicals in bottle washers. Bulletin 1920, 2p.—*Proportioneers, Inc., Providence.* (216B)

Protective Coatings

Show how to protect masonry and metallic equipment from corrosive liquids by means of various cement mortars and interlining compounds. 8p.—*Pennsylvania Salt Mfg. Co., Philadelphia.* (216C)

Water Treatment

Technical paper discusses development of a sub-surface washer for use in demineralizers, filters, and water softeners. Numerous drawings illustrate unit, which reduces problem of bed fouling. Technical Reprint T-139, 8p.—*Graver Water Conditioning Co., New York City.* (216D)

Lighting Specifications

Considers latest standard specifications for industrial lighting units. This 1956 edition contains revisions on both incandescent and fluorescent fixtures. Tables and graphs present full data. 35p.—*R. L. M. Standards Institute, Inc., Chicago.* (216E)

Insulation Adhesive

Leaflet gives tips on use of a special adhesive for applying foam-type insulation directly to masonry ceilings. Use of adhesive is said to eliminate need for stripping, shoring, nailing and skewering. Bulletin 34, 2p.—*E. H. O'Neill Floors Co., Cicero, Ill.* (216F)

Air Conditioners

Gives engineering data and specifications for a series of gas air conditioners, evaporative water coolers, and a steam-operated, 25-ton water chiller. Drawings show dimensions and component parts. 12p.—*Servel Inc., Evansville, Ind.* (216G)

Globe Valve Line

Circular shows construction facts and advantages for a new series of globe valves available in ¼- to 2-in. sizes. Units are rated for 150 to 200 lb. sat. steam and 300 to 400 lb. WOG. Circular 605, 2p.—*Lunkenheimer Co., Cincinnati.* (216H)

High Temperature Pumps

Tells advantages of a motor-pump unit for handling fluids at temperatures up to 1,000 F. Drawings and charts illustrate operation. Bulletin 1040, 4p.—*Chempump Corp., Philadelphia.* (216I)

Sectional Condenser

Specifies benefits of a sectional refrigeration condenser rated for 100 to 240 tons refrigeration capacity. Close-up photos show details. Bulletin 130, 4p.—*Niagara Blower Co., N. Y. C.* (216J)

Air-Line Valves

Comprises pictures of spring-type, lever-operated, safety, quick opening, check, globe and angle valves for air service line. Sizes and pressure ratings also given. Circular 587, 4p.—*Lunkenheimer Co., Cincinnati.* (216K)

Dry-Type Air Filter

Gives features of a self-cleaning, dry-type air filter, specifically constructed for the textile industry. Advantages listed, however, show possibility of food industry applications. Bulletin 234-C, 8p.—*American Air Filter Co., Inc., Louisville, Ky.* (216L)

Plastic Valves

Treats of a valve and various pipe fittings constructed of plastic polyvinyl chloride. Chart lists dimensions and other selection data. 6p.—*Lunkenheimer Co., Cincinnati.* (216M)

High-Short Sterilizer

Leaflet presents construction, application, and operational facts on a new, continuous heat exchanger for high temperature, short time sterilization of liquid and semi-liquid products. Unit is said to provide positive temperature regulation within ±½ deg. F. 2p.—*W. F. and John Barnes Co., Rockford, Ill.* (216N)

Controlled Pumping

Technical treatise reveals fundamentals of controlled volume pumping. Numerous tables and diagrams illustrate engineering data. Technical paper 65, 10p.—*Milton Roy Co., Philadelphia.* (216O)

Cooling Tower

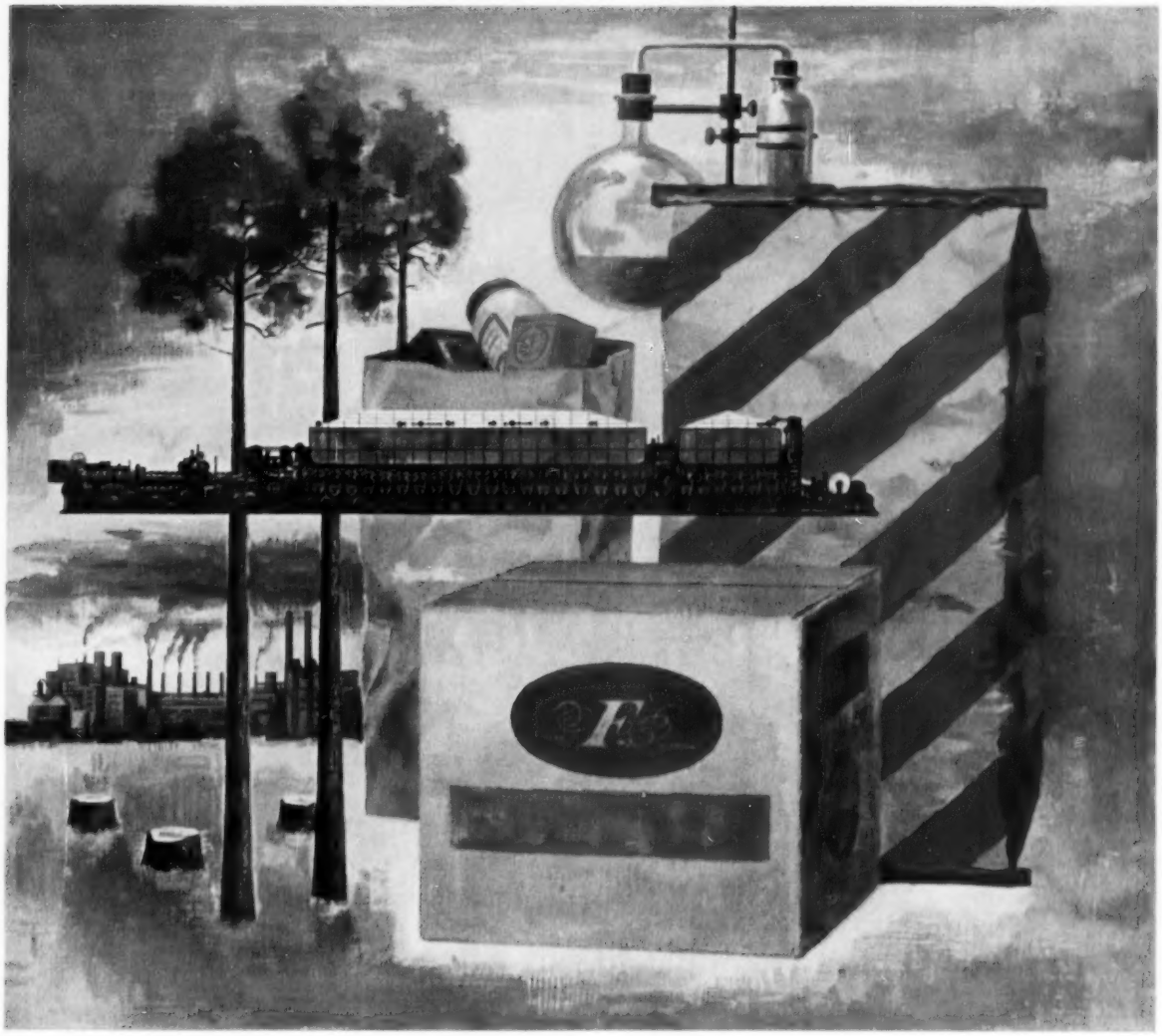
Considers design of a new, induced-draft cooling tower. Drawings show individual construction features. Bulletin CP-56-1, 4p.—*Foster-Wheeler Corp., New York City.* (216P)

Feed-Back Defroster

Comprehensive tables give full dimensions and selection data for a feedback-type defroster. Diagram shows installation. Manual TV 320, 16p.—*Kramer Trenton Co., Trenton, N. J.* (216Q)

Air Grilles

Specifies a line of air-diffusing grilles for air-conditioning applications. Drawings show construction and installation. Catalog F-7757, 4 p.—Barber-Colman Co., Rockford, Ill. (216R)



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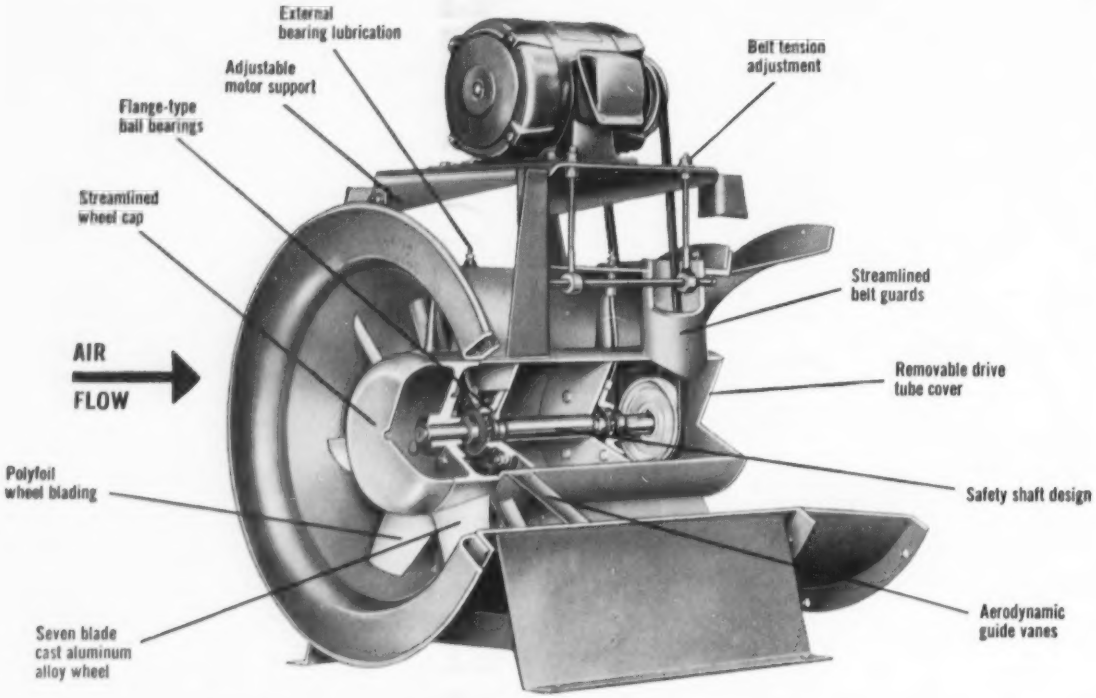

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PROCESSING

Scaling Feeder

Concerns features and applications of a feeder and scale meter utilizing continuous belt-type measurement of product flow. Units feature remote control and automatic intermittent operation. Publication TA-1002-M-1, 8p.—*Wallace & Tiernan, Inc., Belleville, N. J. (219A)*

Salt Dispenser

Covers all features of a granular dispenser for canning line applications. Heating element keeps salt dry, dispensing plate insures accurate measurement. 8p.—*Diamond Crystal Salt Co., St. Clair, Mich. (219B)*

Filters and Mixers

Informs on a line of disk filters and agitators. Filters are caster-mounted for complete portability. Mixers are available in portable and stationary models. Process tanks from 5 to 500 gal. capacity are also shown. 4p.—*Alsop Engineering Corp., Milldale, Conn. (219C)*

Blending Machines

Concerns series of batch-type and continuous ribbon mixers, dry blenders, ball mills, and propeller mixers. Characteristics of all machines are listed. Bulletin E-1, 12p.—*International Engineering, Inc., Dayton, Ohio (219D)*

Super Filter

Considers action of a two-stage, continuous filter that separates particles down to 40 microns in size. Unit features low-pressure drop, and is available with carbon or stainless steel construction. Catalog SAK-057, 8p.—*Cuno Engineering Corp., Meriden, Conn. (219E)*

Blenders, Dryers

Shows line of machines for granulating, mixing, and drying various industrial materials. Tables list selection data. Text describes construction and function. Bulletin 609, 8p.—*F. J. Stokes Machine Co., Philadelphia. (219F)*

Vacuum Dehydrator

Pictures operation of a rotary vacuum dehydrator with a capacity of 300 to 1,000 lb. of dried product per hour, depending on product. Unit takes liquids and reduces them to powders by means of radiant heat. Bulletin 55-126, 4 p.—Chain Belt Co., Milwaukee. *(219G)*

Plate Heat Exchanger

Informs on a new zig-zag patterned heat exchanger plate for dairy, juice, oil, and wine applications. Pictures show set-up, and text describes the advantages. 4 p.—Kusel Dairy Equipment Co., Watertown, Wis. (219H)

INSTRUMENTS

Temperature Controllers

Shows action and design of an electric, indicating, temperature controller that uses expansion of oil as operating medium. Tables list both prices and selection data. Bulletin 1025-B, 4p.—*Sarco Co., Inc., New York City. (219I)*

Diaphragm Manometer

Installation diagram depicts operation of a low-pressure, diaphragm-type manometer. Unit measures vacuum, pressure, or differential pressures where ranges do not exceed 4 in. of water, and static pressure is no more than 5 psig. Instrument finds application in air and gas lines. Bulletin 98175, 2p.—*Taylor Instrument Companies, Rochester, N. Y. (219J)*

D-C Amplifiers

Series of technical essays discuss various phases of a d-c amplification system. Performance, applications, and ranges of this equipment are detailed. 20p.—*Weston Electrical Instrument Corp., Newark, N. J. (219K)*

Automatic Batching

Concerns features of an electronic, punch-card batching system said to give unlimited batch selection and positive accurate control. Automatic compensation for moisture-content is an added feature. Bulletin H-561, 4p.—*Heltzel Steel Form & Iron Co., Warren, Ohio. (219L)*

Heating Controls

Detailed catalog shows full line of automatic air conditioning controls, fan and limit controls, humidity controls, and other accessory units. Specifications and prices are all tabled. Spring 1956 catalog, 54p.—*General Controls, Glendale, Calif. (219M)*

Cable Supports

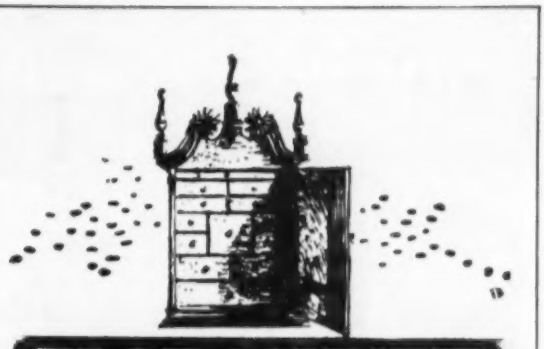
Details of hangers, ladders, and supports for instrument cables and tubing are given with numerous illustrations to aid selection. Full specifications and dimensions included. Bulletin 156-E, 12 p.—P-W Iniustries, Inc., Philadelphia. *(219N)*

Flow Meters

Describes a series of glass tube, variable area flow meters. New features include added strength, corrosion resistance, and greater versatility. Catalog 10-A-25, 16 p.—Fischer & Porter Co., Hatboro, Pa. (219O)

Automatic Controls

Covers extensive line of instruments for automatic process control. Listed are level indicators, feedwater controls, timers, and transfer switches. 58 p.—Lumenite Electronic Co., Chicago. (219P)



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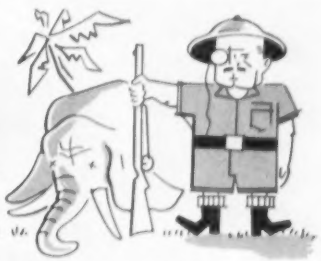

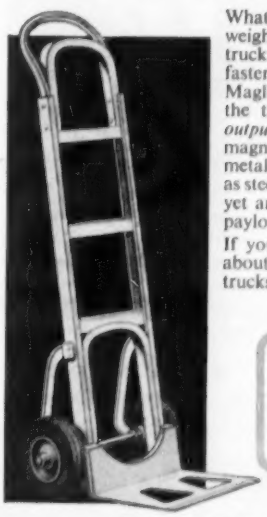

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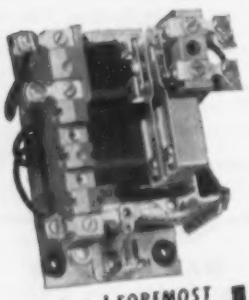

• Catalog also covers Induction Relays, Relay Enclosures, Contactors and Starters, Multiple Pump Controls, Electrode Holders, Starter and Relay Combinations, Special Controls and Panels for the Food Industry.

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MAINTENANCE

Boltless Shelves

Presents full information on a line of steel shelving that clips together to eliminate bolts. Units come in various shapes and designs for storage of spare parts or stock. Catalog 706, 12p.—*Frick-Gallagher Mfg. Co., Wellston, Ohio. (220A)*

Steam Cleaners

Treats of advantages and operation of a portable, steam-generating unit and gun for steam-cleaning equipment. Steam is produced by electric means. Bulletin JC-100, 6p.—*Pantex Mfg. Corp., Pawtucket, R. I. (220B)*

Tube-Bending Tool

Illustrates usefulness of a tube bender, calibrated to insure accurate curves in copper, brass, aluminum, steel, and iron pipe. It handles tubing from ¼ to 1¼ in. O.D. 2p.—*Holsclaw Bros., Inc., Evansville, Ind. (220C)*

Mechanical Assembly Kits

Tells of kits containing perforated boards, shafts, gears, couplings, adapters, and other mechanical components used for construction of model machines from blueprints. Models serve as intermediate stage to development of full scale machines. Bulletin TGS 1110, 16p.—*Servo Corp. of America, New Hyde Park, L. I. (220D)*

Filing Machine

Concerns bench-type, electric-powered machine for filing, sawing and lapping operations. Device will take files of all shapes, as well as metal-cutting saw blades. Various models pictured. 4p.—*Sales Service Machine Tool Co., St. Paul, Minn (220E)*

Casters and Wheels

Condensed catalog "briefs" a line of steel and rubber casters and wheels with capacities from 175 to 3,000 lb. 4p.—*Rapids-Standard Co. Inc., Grand Rapids, Mich. (220F)*

Mixer Drive Manual

Operating and maintenance instructions are covered in a manual on a heavy duty mixer drive assembly. Sheave, gear, and horsepower facts are tabled. Bulletin 931, 6 p.—Pfaudler Co., Rochester, N. Y. (220G)

Force Gage

Concerns application of a force gage in numerous testing situations. Device can be used, for example, to test valves, strength, calibrations, wire, springs, and tensions. Bulletin 11E, 6 p.—W. C. Dillon & Co., Inc., Van Nuys, Calif. (220H)

Power Sweepers

Details operation of a riding-type power floor sweeper. Machine has vacuum attachment for cleaning shelves and equipment. It can cover over 100,000 sq. ft. of floor space per hour. 4 p.—Wayne Mfg. Co., Pomona, Calif. (220I)

Cutting Fluids

Technical discussion covers role of cutting fluids in machine shop operation. Numerous pictures illustrate pointers. *Lubrication*, April '56.—Texas Co., New York City. (220J)

V-Belt Line

Illustrated bulletin depicts a wide line of V-belts. Tables list sizes and other selection facts. Bulletin V-1400-B20-P, 8 p.—Worthington Corp., Oil City, Pa. (220K)

MATERIALS HANDLING

Lift Truck Line

Bound, loose-leaf catalog covers extensive line of electric materials handling equipment. Notebook divisions separate different machines, such as riding-type lift trucks, walkie trucks, stackers and cranes, hand trucks, and dragline trucks and storage racks.—Lewis-Shepard Products Inc., Watertown, Mass. (220L)

Portable Conveyors

Concerns portable and fixed conveyors for moving a variety of loose products and packages. Specifications and capacities are detailed. Bulletin 105, 8 p.—Belt Corp., Orient, Ohio. (220M)

Conveyor Belting

Gives application illustrations and construction features for several types of conveyor belting. Engineering facts are included for the stitched canvas products. 44 p. —C. R. Daniels, Inc., Daniels, Md. (220N)

Belt Tripper

Describes a track-mounted device for discharging loaded conveyor belts from any intermediate point on belt's horizontal run. Designed specifically for trough conveyors carrying grains and similar granular products. Device is self-propelled. Bulletin 156, 2p.—*Stephens-Adamson Mfg. Co., Aurora, Ill. (220O)*

Roller Conveyors

Presents description of component parts and pictures completed assemblies for a series of roller conveyor systems. Equipment includes spurs, curves, limit switches, and stops. Bulletin 100, 20 p.—Harry J. Ferguson Co., Jenkintown, Pa. (220P)

Single Mast Truck

Concerns application of a single lift mast to a 2,000-lb.-capacity lift truck. Feature gives greater operator visibility. 2 p.—Hyster Co., Portland, Ore. (220Q)

PACKAGING

Label Coder

Treats of a compact label coding machine that handles a wide variety of shapes and sizes in packets up to 500. Labor costs are cut with the device, for its output is 2,000 units per min. 1 p.—Griffin-Rutgers Inc., New York City. (221A)

Filling Machine Line

Covers wide line of high-speed fillers for viscous and semi-solid products. Straight-line units range from multi-valve automatic machines to a small semi-automatic model. Catalog 56, 16 p.—Hope Machine Co., Philadelphia. (221B)

Multi-Step Packager

Concerns an automatic machine that opens cases, accumulates cartons, fills them into case, and seals box. Various advantages for the compact unit are noted. 2 p. —Schroeder Machines Corp., Syracuse, N. Y. (221C)

Bag Filler, Sealer

Considers operation of an automatic bag maker, filler, and sealer for plastic containers. Unit is said to feature simple construction and extremely accurate weighing. Output ranges from 30-50 bags per min. 2 p.—Triangle Package Machinery Co., Chicago. (221D)

Milk, Aerosol Fillers

Folder contains bulletin sheets describing and picturing a series of fillers and related equipment for filling aerosol cans and paper milk cartons. Features are fully explained with text and illustrations.—Majonnier Dawson Co., Franklin Park, Ill. (221E)

Outsert Applicator

Gives pertinent information on a new machine for applying outserts on bottled products. Unit is designed to apply booklets at speeds up to 200 per min. and spot them at any predetermined place. Bulletin 933, 2 p.—Pfaudler Co., Rochester, N. Y. (221F)

Product Weigher

Automatic machine to weigh granulated products is described in this bulletin. The foreign-made unit dumps pre-weighed quantities into containers held by an operator. 4 p.—Constructions Industrielles de Precision, Paris, France. (221G)

QUALITY CONTROL

Distillation Kit

Elimination of the custom-made distillation set-up is claimed as a result of a new kit described in this bulletin. With stock parts, proper apparatus can be constructed to meet each new distillation demand. Bulletin FS-256, 12 p.—Fisher Scientific Co., Pittsburgh. (221H)

Chromatography Devices

Depicts wide line of apparatus for complete coverage of chromatographic and electrophoresis work. Solvent chemicals are also detailed. Catalog C-465, 36 p.—Scientific Glass Apparatus Co., Inc., Bloomfield, N. J. (221I)

Glass Piping

Specifies size of pipe and fittings available in Pyrex glass for laboratory lines. Specifications are tabled. Catalog 80-10, 4 p.—Fischer & Porter Co., Hatboro, Pa. (221J)

Centrifuge Selection

Presents principles of separation and details advantages for a laboratory-sized centrifuge. Other industrial units are also pictured. Bulletin 2173, 6 p.—Centrico Inc., Englewood, N. J. (221K)

Recording Titrometer

Automatic plotting is main feature listed for a recording titrometer. The accurate instrument is said to plot the complete titration —showing up to three end points. Bulletin 640B, 8 p.—Precision Scientific Co., Chicago. (221L)

Water Stills

Describes a full line of stills for making distilled water. Units range in capacity from ½ to 1,000 gal. per hr. Catalog G, 50 p.—Barnstead Still & Sterilizer Co., Boston. (221M)

Rotational Viscometer

Covers details of a high speed, wide-range instrument for measuring fluid viscosity by means of a rotary table and stationary bob. Data Sheet 10911, 2p.—*Precision Scientific Co., Chicago, Ill. (221N)*

Activated Charcoal

Technical bulletin describes general characteristics of activated charcoal and lists wide line of uses and advantages for the compound. Bulletin E-1617, 6p.—*Barnebey-Cheney Co., Columbus, Ohio. (221O)*

INGREDIENTS

Salt for Margarine

Reports research results on use of salt as a margarine ingredient. Factors such as impurities, sampling, and testing are fully discussed. 6p.—*Morton Salt Co., Industrial Div., Chicago. (221P)*

Flavor Price List

Latest 1956 listing shows the wholesale prices for a line of essential oils, flavors, concentrates, colors, and other like compounds. 12p.—*Fritzche Bros., Inc., New York City. (221Q)*

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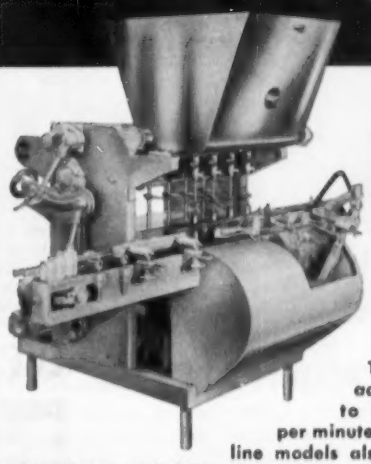

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Ice Cream Flavors

Gives prices for a series of ice cream syrups, fruits, candies, bases, and flavors. 8 p.—Ramsey Laboratories, Cleveland. (222A)

Flavor List

Spring-Summer catalog lists wide variety of flavors and essences of use to food processors. Prices are included. 26p.—*Magnus, Mabee & Reynard, Inc., New York City. (222B)*

Prices on Flavors

Spring list shows wholesale-quantity prices for colors, concentrates, essences, and flavors. 12p.—*Fritzsche Bros., Inc., New York City. (222C)*

Enrichment Story

Gives historical development and present facts on use of vitamins and minerals for enrichment of cereal and grain products. Includes story of white flour, macaroni products, corn meal, and rice. 18 p.—Hoffman-La Roche, Nutley, N. J. (222D)

Ascorbic Acid

Technical facts are presented for the use of ascorbic acid in beverages. Its role as an antioxidant is discussed, as well as such factors as minimum daily human requirements, analysis, and labeling regulations. Bulletin 86, 8 p.—Chas. Pfizer & Co., Inc., Brooklyn, N. Y. (222E)

MANAGEMENT

Employee Absenteeism

Pocket brochure briefly discusses some factors in the pressing problem of absenteeism. Particular attention is paid to the role played by a good health plan. 12 p.—Occupational Health Institute, New York City. (222F)

Army Tomato Requirements

Latest research results, taken from a symposium sponsored by Quartermaster Food & Container Institute, sets forth Army requirements for canned tomatoes. 64 p.—Quartermaster Food & Container Institute, Chicago. (222G)

Broker Directory

Now available is the 1956 listing of Canadian Food Brokers. Publication features 217 member firms in major marketing areas across Canada.—*Food Brokers Assn. of Canada, Toronto, Ont.* (222H)

Personnel Records

Leaflet illustrates a method for maintaining personnel time records, and controlling payroll expenditures. Compact record sheets replace ordinary time books and time sheets. 3p.—*Edward Brodsky, Fluishing, N. Y. (222I)*

Who put the Ac'cent in Mrs. America's Chicken Pot Pie?

The giants of the fast-growing convenience food industry used monosodium glutamate in hundreds of millions of chicken pot pies last year. Ac'cent protects flavor in canned and frozen foods... makes *all* heat 'n eat foods taste better. Because flavor is important in selling your product, wouldn't Ac'cent help build brand preference by building flavor?

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Write For "Food Facts"
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LEWIN ASSOCIATES
Industrial Consultants

DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultation — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing — Consultation in Managing, Warehousing, Distribution — Formulas, New Products
343 West 56 St., N. Y. 19, N. Y. JUdson 6-1749

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

GUSTAVE T. REICH & ASSOCIATES
Consultant to the Food Industries.
COMPLETE CONTINUOUS PROCESSES.
Operation — Waste Disposal
AUTOMATION
1422 Chestnut St. Philadelphia 3, Pa.

WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street Waltham 54, Mass.

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

WISCONSIN ALUMNI RESEARCH FOUNDATION
Projects, Consultation, and Production Control Services in
Biochemistry, Chemistry, Bacteriology, Toxicology—
Insecticide Testing and Screening.
Write for price schedule.
P. O. Box 2217-P. Madison 1, Wisconsin

THE CONSULTING ENGINEER

"By reason of special training, wide experience and tested ability, coupled with professional integrity, the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert. His services, which do not replace but supplement and broaden those of regularly employed personnel, are justified on the ground that he saves his client more than he costs him."

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the advertisements on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT
"Think SEARCHLIGHT first"

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work
Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered
Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

——RATES——

UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted—The rate is one-half of the above, payable in advance.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS or Inquiries to Classified Advertising Division of FOOD ENGINEERING, P. O. Box 12, N. Y. 36, N. Y.

ADVERTISING MAN WANTED FOR TECHNICAL PRODUCTS

- Previous advertising experience not necessary but helpful. Must have at least two or three years of college with courses in engineering and technical subjects and like to write.
- If you have the qualification we have an opportunity open for you. Man selected will be trained in all phases of industrial advertising. In your letter of application state age, education, positions held, and give statement of why you want a career in advertising. Location: well-known Connecticut company.

P-1206, Food Engineering
330 W. 42 St., New York 36, N. Y.

WANTED
MECHANICAL ENGINEER

Kentucky location of national concern has excellent permanent situation in plant engineering department for mechanical engineer with approximately two years experience in operation and maintenance of automatic bottling and labeling equipment. Must have desire for early recognition of ability and performance since position open is in direct line for possible early advancement to greater responsibility in engineering or production.

No traveling required. Attractive starting salary. Excellent benefit program.

Please submit complete resume, including details of education and experience and state starting salary required. Your reply will be held confidential.

P-1335, Food Engineering
330 W. 42 St., New York 36, N. Y.

RESEARCH MILLING ENGINEER

Opportunity for top flight Research Engineer for modern Corn Mill in Midwest. Experience in Corn Milling preferred. Scope of work to include improvement of Milling techniques as well as new product development. Excellent opportunity for aggressive individual. Give full particulars in letter to

P-1714, Food Engineering
520 N. Michigan Ave., Chicago, Ill.

WE NEED
FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you
c/o this publication, Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Wanted experienced quality control man for position with opportunity in one of the Southwest's largest fruit and vegetable canning plants located in a city of 40,000 population in the lower Rio Grande Valley of Texas. Must be experienced in general vegetable lines. Will consider recent graduated Food Technologists. Write Harlingen Canning Co., P. O. Box 31, Harlingen, Texas, giving age, education and past employment history.

Grocery Chain wants experienced Food Technologist to head up established products control department offering technical service to buying, merchandising, and production departments. The man sought is approximately 30 years old and presently holding a responsible position. College degree and several years experience in bakery, flour mill, canning, dairy, or other branch of food handling required. He should have a firm foundation of laboratory experience and a broad inquiring approach to those phases of the operation which may open up to him. Northeastern location. Send full resume, salary requirements, and photograph (if available) with first letter. Replies confidential. P-1850, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F. P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Profits—small or elusive? Management expert with 35 years experience in the food industry guarantees cure for financial anaemia. PW-1829, Food Engineering.

Food Technologist, Microbiologist, Chemist 20 years experience in research development, quality control in brewing, corn products. Ph.D. PW-1745, Food Engineering.

MANUFACTURER'S REPRESENTATIVE

Long established manufacturer's representative (chemical) is desirous of representing reputable food material and supplies firms. Chicago location. Box

RA-1336, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

FOR RATES OR INFORMATION

About Classified Advertising

Contact The McGraw-Hill Office Nearest you

ATLANTA, 3
1321 Rhodes-Haverty Bldg.
WAlnut 5778

BOSTON, 16
350 Park Square
HUbbard 2-7160
H. J. SWEGER

CHICAGO, 11
520 N. Michigan Ave.
MOhawk 4-5800
W. HIGGENS

CINCINNATI, 37
1915 Rockingham Ave.
REdwood 1-4537
W. GARDNER

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000
W. SULLIVAN

DALLAS, 2
Adolphus Tower
Main & Akard Sts.
D. BILLIAN

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793

LOS ANGELES, 17
1125 W. 6 St.
MAdison 6-9351
P. CARBERRY

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000
R. LAWLESS
S. HENRY
D. COSTER
R. HATHAWAY

PHILADELPHIA, 3
17th & Sansom St.
Rittenhouse 6-0670
H. BOZARTH
E. MINGLE

PITTSBURGH, 22
919 Oliver Bldg.
Atlantic 1-4707
W. SULLIVAN

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
W. HIGGINS

SAN FRANCISCO, 4
68 Post St.
DOuglas 2-4600
W. WOOLSTON

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED RATE:

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

PROPOSALS, $1.50 a line an insertion.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW Ads or Inquiries to Classified Adv. Div. of Food Engineering, P. O. Box 12, N. Y. 36, N. Y.

REPLIES (Box No.): Address to office nearest you c/o this publication, Classified Adv. Div.
NEW YORK: Box 12. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITY

Wanted: well rated food company desiring diversification of food products manufacturing by consulting food chemist 20 years experience with a successful food products manufacturing expansion plan of research and production. BO-1750, Food Engineering.

WANTED

Anything within reason that is wanted in the field of Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

FANCY FOOD PLANT & BUSINESS

For Sale. Owner retiring. In Southeast. Reputation for finest lines in specialty field. Products have national distribution, ready acceptance, dealer confidence, and are represented across nation through quality brokers and distributers. There are no similar products on the market. JOHN A. PARK, Jr., Broker; 1805 McDonald Lane, Raleigh, N. C., Phone 3-3018

PICKLE PROCESSING PLANT

Eastern Shore Maryland.

16 acres. Fully equipped. Very reasonable.

HYMAN P. TATELBAUM, *Trustee*
10 East Fayette Street Baltimore 2, Maryland

WANTED

150 gallon stainless steel vacuum pan, steam jacketed

EFCO PRODUCTS Inc. Poughkeepsie, N. Y.

BAKER AMMONIA COMPRESSOR

Located in Wyoming, Baker Model 16-12A, 67 Ton cap., with "Century" 75 HP, induction motor, 60 cycle, 3 phase, separate shell and tube type condenser, receiver, etc.; complete installation, attractive prices.

FS-1674, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR SALE

1—Tank, 2,200 Gal. Stainless, Vertical, Insulated, Sanitary Finish.
1—Tank, 600 Gal. Stainless, Vertical, Agitated, Insulated, Sanitary.
1—Truck Tank, Three Compartment on Semi-Trailer, Sanitary, Stainless, Insulated.
2—Tanks, 14,000 Gal. Glass Lined, Horizontal, All Welded.
1—Double Drum Dryer, 32" Dia. x 90" Lg. Drums, Atmospheric.
2—Vacuum Pans, 36" and 48" Mojonniers, 35 and 111 Sq. Ft. Sanitary Stainless Steel.
1—Heat Exchanger, #32-5 Mojonnier, 41 sq. ft. Sanitary S.S.
1—Heat Exchanger, 150 sq. ft. Acme, Sanitary S.S.
2—Mixers, Day Cincinnatus, 75 Gal. Double Sigma Blade, Jacketed, S.S.

BEST EQUIPMENT COMPANY
617 Davis Street Evanston, Illinois
DAvis 8-0926

···· IN STOCK AT LOEB'S ····

Capers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51.
Conveyor, port. Rapid Standard, 16' lg.
Conveyor Tables: belts from 5½" wide x 12' long and up.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent, Buffalo 32" and 43".
Demineralizer: Barnstead 80 GPH.
Disintegrator: Rietz RD-18 st. steel, 75 hp.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf, Devine 20 shelf.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filler Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1'.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettles, Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World. Ermold—auto and semi-auto.
Colloid: Premier 3 hp. and 5 hp.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Screens: Rotex 20 x 48", 42 x 84". Roball 40 x 120" stainless steel. Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. Chicago 22, Ill.
Telephone: Seeley 7-1431 Our 31st Year

FOR SALE

CARTON WRAPPING MACHINE

Package Machinery Waxed Paper Carton Wrapping Machine, Type FF, 5" x 4" x 1¾", change parts for other box sizes are available from the factory. Package Machinery Co. Catalog #H-35. 90 per minute. Will sacrifice. Write or Call

HILL PACKING COMPANY
TOPEKA, KANSAS

Used Mojonnier Filler, Model 90, 14 spouts, rotary vacuum filler and crowner for 12, 16, 24 and 32 oz. bottles. Excellent Condition.

Used 100 gallon stainless steel storage tank with cone bottom. Excellent Condition.

FILPACO INDUSTRIES, INC.
2426 South Michigan Avenue
CHICAGO 16, ILLINOIS

FOR SALE

Complete Pneumatic Scale Straightline High Speed Cartoning Unit

In Excellent Operating Condition
Available For Immediate Delivery

AT A FRACTION OF THE ORIGINAL COST

These units consist of the following machines:

- **High Speed Carton Feeder**
- **High Speed Bottom Sealer**
- **Type D-1 Wax Liner**
- **Six-Scale Net Weight Weigher**
- **High Speed Top Sealer with Compression Drying Unit**
- **All interconnecting conveyoring**

This complete unit was in operation until recently. Operated at approximately 70 units per minute.

INSPECTION CAN BE ARRANGED

Will sell as complete unit or as individual machines.

Write, Wire, or Phone Collect For Complete Details and For Our Special Low Prices

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette St. New York 12, N. Y.
Phone: Canal 6-5334

FILTER

Klein diatomaceous earth filter, stainless construction, 96 sq. ft.; furnished with stainless slurry feeder; immediate delivery, real bargain.

FS-1325, Food Engineering
330 W. 42 St., New York 36, N. Y.

FMC

INCREASE YOUR 8 HOUR PRODUCTION

Mechanize to Economize

MIXERS

Large stock on hand of new and Reconditioned Double Ribbon Mixers for Powders, granulars, crystals, etc., from 200 lbs to 5000 lbs.

2189 J. H. Day, Jacketed Double Ribbon Mixer 28"x26"x70"; 175 Gal.

3893 Readco Jacketed Double Ribbon Mixer; 16"x68"x33"; 210 Gal.

262/G7 J. H. Day, Jacketed Egg Clipper Mixer; 32"x32"x26".

3951/U2 Heavy Duty 200 Gal. Dough Mixer; 36"x38"x42"; geared both ends' 10 Hp

JUICE EXTRACTORS—PULPERS

3971/G1 Chisholm-Ryder, American Utensil Stainless Model B Juice Extractor.

3390/G1 Indiana Brush Type Finisher with Stainless Steel Screens.

CUTTERS, CHOPPERS, GRINDERS, ETC.

2936/E1 Anderson Model No. 4 Dicer with 1 Hp.

3628 D1 Cincinnati Meat Grinder 4½" Screw with 10 HP motor.

3484/A 31 Sterling Carborundum Type Potato Peeler with 2 HP motor.

FILLERS

2184/B45 Berlin Chapman 15 Station Syruper-Filler; up to No. 3's.

3453/M1 Berlin Chapman 7 Station Stainless Filler, up to No. 16's.

3280/W1 Horiz Stainless 14 Station Gravity-Vacuum Filler up to quarts.

Karl Kiefer Rotary Vacuum Fillers; 12, 16 and 18 Station Machines on hand.

3453/M7 Ayers Stainless 12 Spout Series C Filler up to 5' dia. containers.

4042/G2 Pneumatic Scale 16 Spout Automatic Straight Line Filler.

Filler Machine Co. Piston Fillers; 2, 4, 7 and 11.

3484/A44 M. & S. 10 Pocket Stainless Steel Fillers.

4033/W1 M. & S. 6 Pocket Bronze Filler No. 2.

3640/S1 FMC Hand Pack Filler with 2 Stainless Rotating Table; for 203 and 300 Cans.

Stokes & Smith Auger Type Semi Aut. Powder Fillers Model G up to 5 lbs.

3673/L34 Triangle Elec-tri-pak Automatic Weigher-Filler 4 Station Model A4 with conveyor.

KETTLES

New and used Kettles in Stainless, Nickel, Aluminum, Copper, Steel, Glass Lined, Iron, in all wanted sizes Steam Jacketed or Unjacketed; some with agitators.

TANKS

In stock at all times STAINLESS STEEL Vertical and Horizontal Tanks, with or without covers; with or without agitators—all sizes:

4168 Stainless 3200 Gal. Oval (milk truck type) Tank; 4'x6'x21' with 18" manhole and 4 cradles.

4029 E1 A. O Smith Stainless Lined 20,000 Gal. Pressure Tanks' (1351) 10'x30'; vertical or horizontal use.

VACUUM PANS, COOKERS, EVAPORATORS

3544 Pfaudler Glass Lined Closed Top Jacketed Vessel 4'x4'.

Large Stock on Hand Now

PFAUDLER REACTORS

Glass Lined — Jktd — Agtd

50 Gal—100 Gal—300 Gal—1000 Gal

9908 H3 Aluminum Jacketed Vacuum Pan 250 gal. 40" Diameter; manhole.

RETORTS

Always in stock, standard 3 Basket Retorts 40"x72".

3259/64 Horizontal Retorts 66"x14' long with double track and door opening at each end; steam pipes full length.

All types of Dryers, Flakers, Rotary and Drum Types; Tray and Truck types either for Vacuum or Atmospheric pressure; Ovens, Crystallizers, Sterilizers, Humidifiers, Air Conditioners, etc.

CAPPERS

Rosina single and double head automatic Cappers; Capem single and double head Cappers; Pneumatic Scale 4 head Capper.

LABELERS

Wrap around Labelers for cans, and round bottles, jars, etc., by standard-Knapp, Burt, Kylor, Nu-Way, etc.

Spot Labelers by New Jersey Pony Labelrite, Ermold, World for any size container and label.

Fully Automatic Labelers by World, Pneumatic Sealer and others.

SEND US YOUR INQUIRY

FRED R. FIRSTENBERG, *Pres.*

FIRST MACHINERY CORP.

209-289 TENTH ST.

BROOKLYN 15, N. Y.

STerling 8-4672

A BRILL BUY

. . . IS THE BEST BUY

SPECIALS

1—Buflovak #6.5-29-D double effect S/S Evaporator.

1—I. R. 208 ton Jet Refrigeration unit.

1—Buflovak 32"x120" double drum Dryer.

1—Buflovak 6' x 5'6" Monel, single drum Flaker.

1—Link Belt 5'2" x 20' steel Roto-Louvre Dryer.

1—Hersey 18"x12' Hot Air Rotary Dryer 304 S/S.

3—Elmco 18"x24", 18"x12", 316 S/S Rotary Vacuum Filters.

1—Bird 18"x28" solid bowl, Continuous Centrifuges 310 S/S.

1—Sharples PN-14 Super-D-Canter 304 S/S.

1—Fletcher 20" Suspended type Centrifugal 304 S/S.

4—Sweetland Filters #3, #5, #7, #12.

6—Day "Cincinnatus" Sigma Blade Mixers 600, 200 and 100 gal.

1—#2TH Mikro Pulverizer, 7½ HP motor.

2—Rotex Sifters 40"x120", 40"x84".

BRILL EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.

OR

4101 San Jacinto, Houston 4, Texas

CALL "CONSOLIDATED" FIRST AND SAVE!

3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
2—Stainless Steel Hersey Rotary Dryers, 5'x20' and 6'x23'.
3—Buflovac 42x120, 32x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—54"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.
1—Unused #12 Sweetland FILTER, 48 bronze monel covered bottom drainage leaves 3" o/o. latest type; 1—#2, 23 copper leaves 1½" ea.
1—Day #30 Imperial jack. Mixer, 75 gal.
2—Sperry 18x8" Filter Presses, 11 ch.
5—Horiz. Dry Powder Ribbon Mixers, 4000#, 1500#, 500#.

OUR 39TH YEAR

Consolidated Products Company, Inc.

158 Observer Hgway, Hoboken, New Jersey
Tel.: HO 3-4435 • N. Y. Tel.: BA 7-0600

CHR. HEURICH BREWERY WASHINGTON CLOSES ITS DOORS Forever!

The only brewery in our nation's capital offers the following equipment for sale:

Barry-Wehmiller Vortex pasteurizer, new 1948; Ermold 8-wide labelers; Standard-Knapp case packer, Model 830, new 1948, gluer and compression unit; unscrambler, can rinser; American Can closing machine Model 440-BGF; FMC can weigher; 30 steel tanks totaling 630,000 gals., including 32—14,880 gal. one-piece horizontal tanks, plus 56 ring or sectional type tanks; 83 oak and cedar tanks; 4—5400 bushels each approx. riveted steel storage bins; 4 copper hot water tanks; Klein #3 stainless steel filler, approx. 240 sq. ft. with separate slurry feeder; 3 Gardner-Denver air compressors; 4 York shell and tube vertical condensers; thousands of other items; everything sold individually; inspection invited; offer subject to prior sale.

Contact:

CHR. HEURICH BREWERY

26th & D Streets, Washington, D. C.

Telephone: REpublic 1600

E. C. H. SPECIALS

3 Pony Labelers 86MX-86MXX & 86MLL World Twin Turret Labeler, 120 pm
Biner Ellison Model 16-Q Filamatic
Rotex 40x48" Sifter, 3 deck, 2 hp mtr.
MRM 12 spt. SS Rotary Vacuum Filler
Premier 6" SS Colloid Mill 20 hp motor
Resina Capper, twin, 120 per minute
New 74 cu. ft. SS Spiral Mixer 2220 lbs.
Capem SIF auto. Capper, up to 88 mm.
Mikro #4 Pulverizer with 40 hp motor
Wrap around Labelers, All Makes & Sizes.

New SS Sturtevant #7 Rotary Blender

NEW—STEEL & S/S MIXERS, KETTLES TANKS & DRYERS. Fabricated to your specifications. Engineering Advice available.

WE BUY COMPLETE PLANTS OR SINGLE UNITS

WHAT HAVE YOU FOR SALE?

YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.

111 33rd Street, Brooklyn 32, N. Y.

SOUTH 8-4451—4452—8782

AIR COMPRESSORS

2—Only, Nash Hytor air compressors, cap 225 cfm, at 60 psi; with 60 HP motors, immediate delivery, completely guaranteed.

FS-1672, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR SALE

2—Buflovak 42 x 120" double drum dryers, motor driven
1—Fitzpatrick model K comminuter
1—150 sq ft single effect monel evaporator

CHEMICAL & PROCESS MACHY. Corp.
52 Ninth Street Brooklyn 15, N. Y.

"Day" #6 Double Arm Mixer; 100-8000# Mixers, all types; Bag Fillers; 1000 gal. S.S. Tanks; Roller Mills 5x12, 12x32, 16x40; 48-HP motor; Complete Liquid & Power Filling-Packaging Lines, cheap; Rotex #7 Sifter; 24x24 Alum. FP; Simplex Celloph. Bag Formers & Sealers.

I. E. NEWMAN, 5602 Blackstone, Chicago 37

FOR QUICK SALE

Packomatic Packaging Machine

1952 Model, Used only 2 years. Complete with 2 motors—220 volts—60 cycle—3 phase Ac. and speeds up to 600 os per hour, with 30 second drying time.

C R C MACHINERY
324 Park St. New Britain, Conn.

Vortex Pasteurizer — Cooling Unit

Barry-Wehmiller Model 1204 automatic unit, new 1948, still erected and priced about 1/3 of new. Inspection invited for this wonderful machine which cannot be readily duplicated. Complete details on request, subject to prior sale.

FS-1677, Food Engineering
330 W. 42 St., New York 36, N. Y.

If there is
Anything you want . . .
that other readers of this paper can supply
Or —
Something you don't want
that other readers can use, advertise it in the
SEARCHLIGHT SECTION

FOR SALE

1—Niagara Model 510-28 type 316 Stainless Steel Filter, 500 sq. ft., with extra set leaves.

3—Fitzpatrick Comminutors, Stainless Steel, models, D, F & K.

2—Rotary Hot Air Dryers, 38" D x 14' L Stainless Steel and 36" x 15' Everdur.

1—Buflovak #6.5 Stainless Steel Double Effect Evaaporator—588 sq. ft.

1—Conkey Triple Effect Evaporator, Silicon Bronze—1900 sq. ft.—UNUSED.

2—Davenport 2A Grains Presses.

1—Stainless Steel Spray Dryer, 19' dia. x 20' high.

1—Bowen 5 dia. Stainless Steel Spray Dryer.

1—Buflovak Double Drum Dryer 32" x 52".

2—Double Drum Dryers, 24" x 36" drum.

2—Triangle G-2-C Elec-Tri-Pak Weighers and Fillers.

4—Mikro Pulverizers, #2DH, #2-TH, #3-TH.

1—10,500 gal. Horizontal Stainless Steel Tank—UNUSED.

25—Stainless Steel Tanks—30 gal. to 6500 gal.

10—4700 gal. Horizontal Brewery Glass Lined Welded Tanks.

2—14,000 gal. Horizontal Glass Lined Welded Tanks.

25—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 40 gal. to 500 gal.

2—Mojonnier Stainless Steel Vacuum Fillers, model 90.

1—Hope type 18 Semi-Auto Single Piston Filler, St. St., Rising Table, Agitated Hopper.

2—Stainless Steel Selectro Screens, 2' x 7', two-deck, enclosed.

BOTTLING CANNING MACHINERY PERRY SUPPLIES PROCESSING

PERRY EQUIPMENT CORP.

1411 N. 6TH ST.
PHILA. 22, PA.

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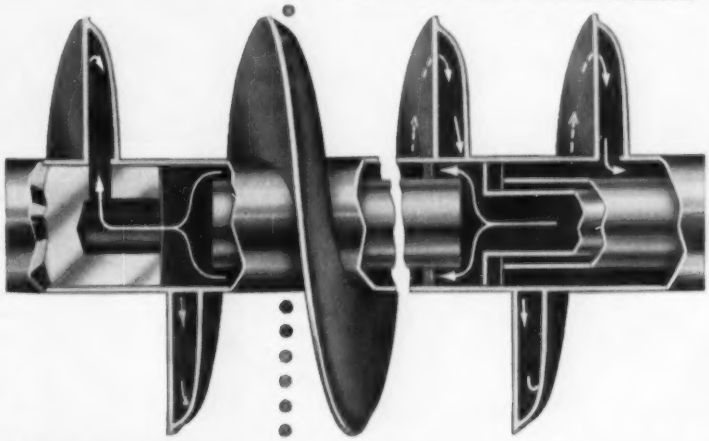

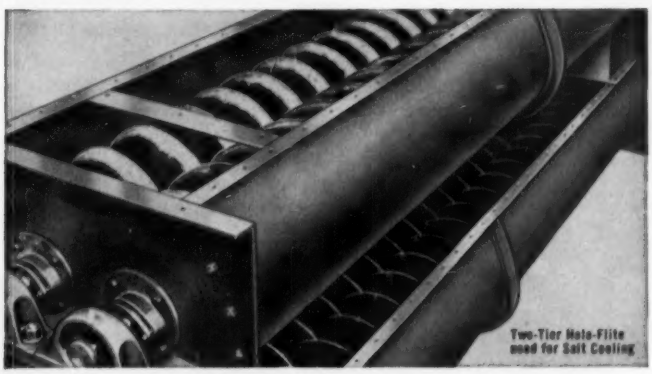

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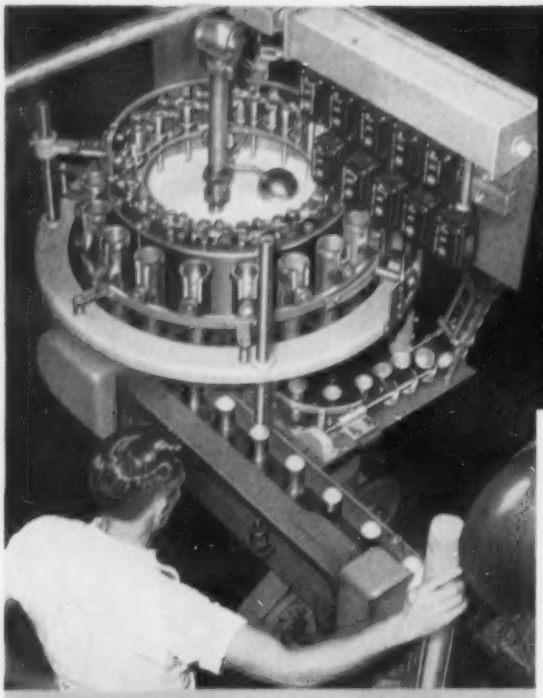

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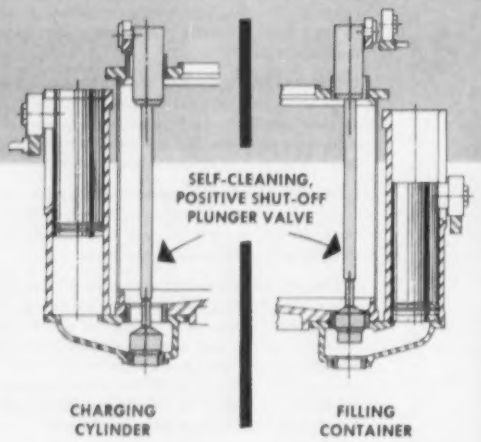

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